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THE AMERICAN TELEPHONE JOURNAL

PUBLISHED EVERY SATURDAY.
TELEPHONY PUBLISHING COMPANY
VOL. 73 NO. 1.

CHICAGO, JULY 7, 1917.

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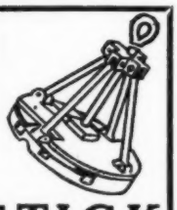

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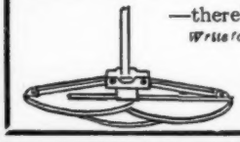

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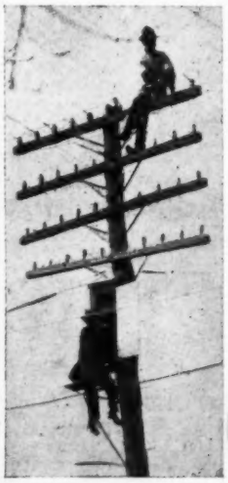

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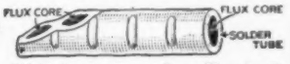

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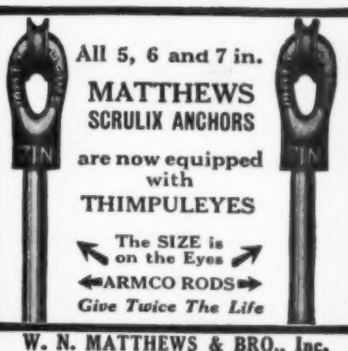

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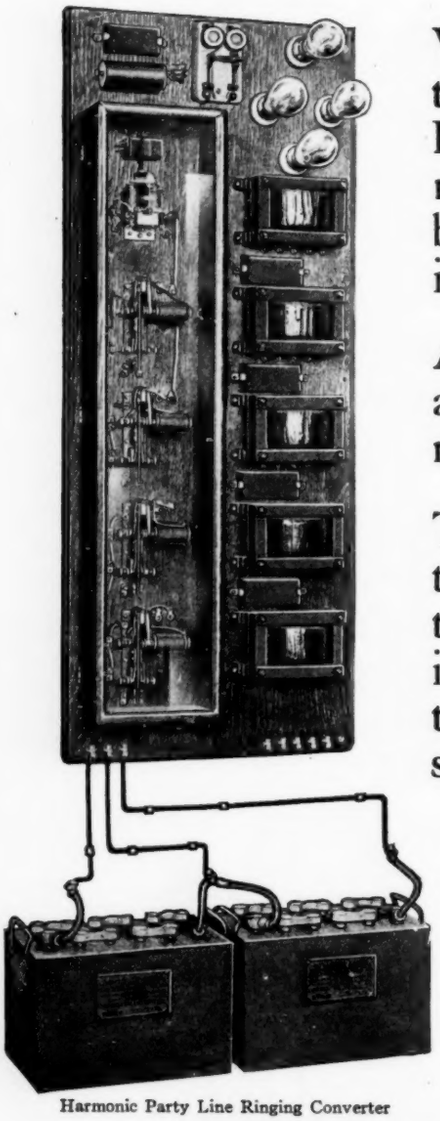

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves

PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY
MONADNOCK BLOCK, CHICAGO
EASTERN OFFICE: 52 VANDERBILT AVE., NEW YORK CITY

J. C. KELSEY, PRESIDENT AND EDITOR.
S. R. EDWARDS, MANAGING EDITOR.

H. D. FARGO, SECRETARY AND TREASURER.
J. R. HASTIE, VICE-PRESIDENT AND ADVERTISING MANAGER.

Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1897

Volume 73
Number 1

CHICAGO, SATURDAY, JULY 7, 1917

Subscription—10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

By the Way—

There is need for more men in the field battalions of the United States Signal Corps—a great opportunity for service.

These battalions will be the ears of the great United States army, part of which is already in France. They have to be trained ears, too—and Independent telephone men have them.

Those who stay at home have important work to do. In many cases men cannot be obtained to fill the places of the men enlisted in the United States Signal Corps. That means more work must be shouldered by the trained employe. It calls for greater individual efficiency.

That Iowa Bell Deal.

In last week's issue of TELEPHONY, "A Hawkeye Observer," commenting on the Bell's purchase of 32 Iowa exchanges, hit straight from the shoulder. He said some things in that article that were not relished by several of the leaders of the United States Independent Telephone Association, because he chided them for not making a more aggressive fight to prevent the sale, which, he reasonably contends, is a violation of the Bell agreement with the Department of Justice.

Living in Iowa and being an Independent telephone man, the writer of the article naturally feels more keenly about the matter than would Independents living and working in other states. It galled him mightily to see that deal creep along, step by step, and end in 32 plants passing into the hands of the Iowa Bell organization. Who can blame him?

TELEPHONY sincerely hopes that the United States Independent Telephone Association will demonstrate that "A Hawkeye Observer's" fears about that organization are unfounded. We do not endorse all his predictions, but there is no gainsaying the fact that some of the directors of the association feel there should be a more aggressive policy pursued in opposition to such Bell purchases.

They are—at least in spirit—a violation of the anti-monopoly platform the government stands upon, and are contrary to the general understanding of the Bell agreement. Already the elimination of competition in toll business by reason of the purchase of these Iowa companies, has resulted in a raise of rates. It is palpably a move toward monopoly, and the Independent association should protest and carry this fight to the last ditch.

We all know that the administration at Washington has its hands full at this time. Nobody with a spark of real patriotism wishes to add an ounce to the load it is already carrying, but the Department of Justice should take cognizance of such maneuvers on the part of the Bell. The fact that some Bell officials are co-operating with the government in war preparations does not necessarily mean that the Bell organization has the right to employ monopoly tactics in Iowa.

Incidentally, what do you think of a big business corporation putting over a deal like that at this time? It cancels all the credit for generous subscriptions to Liberty loans and contributions to the Red Cross, for it betrays a spirit of insincerity that is nothing less than contemptible.

While the United States is fighting for democracy, the Bell autocrats, through middlemen and subsidiaries, continue to scheme for monopoly. The food speculator is the most hated scoundrel in the public eye today, and it is only monopoly that enables him to prey upon the people. Private monopoly in any form is likely to vanish with the progress of the world war.

It is such moves as the Bell has made in Iowa that will show the wisdom of squelching the Bell autocracy in this country as well as the Hohenzollern autocracy in Europe.

Eliminating the Waste.

It is very easy for employes to be careless in handling small parts or articles. By themselves the loss is not much but taken collectively the loss amounts to considerable.

Some companies have had price lists made up showing the costs of many articles, such as dry batteries, bolts, lamps, large size screws, solder, scrap copper, gasoline, insulators, etc. These lists are posted in prominent places or in some cases are printed on cards and distributed to the employes.

Laws of Inductive Interference

Fundamentals of Inductive Interference of Power Lines with Telephone Lines, Especially Grounded Lines—Electromagnetic and Electrostatic Induction—Paper Presented at Convention of Iowa Independent Telephone Association

By Arthur H. Ford

Though the subject of inductive interference from power transmission lines has been widely discussed in recent years, much of the discussion has been unfruitful, because of the failure to make correct application of the fundamental laws of induction. The writer, therefore, takes this opportunity of calling attention to these laws and pointing out, in a qualitative way, their bearing on the subject of inductive interference.

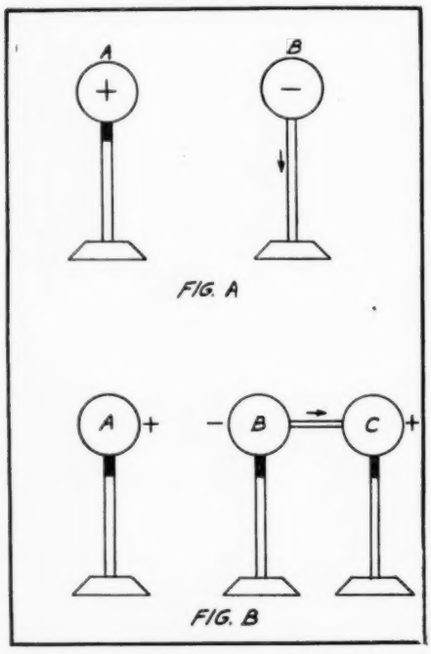

Fig. 1. Illustrations of Electrostatic Induction.

Inductive interference is a matter of increased importance in Iowa, for some 750 miles of high-tension lines were built in the last year. The grounded telephone line is in extensive use in this state, so that special consideration is given it in this paper. Electrostatic induction as regards grounded telephone lines will first be taken up.

Whenever an electric conductor, as the sphere *A*, Fig. 1-*A*, has an electric charge imparted to it, any uninsulated conductor, *B*, placed near it will have a negative charge induced on it. During the time that *A* is being charged, a current of electricity will flow from *B* to the ground.

The difference of potential between *B* and the earth will be dependent on the difference of potential between *A* and the earth, and the relative capacity of *B* to *A* and to the earth. Since, for a given potential between *A* and the earth, the potential between *B* and the earth is dependent on the ratio of the capacities of *B* to *A* and to the earth, the same conditions will hold for conductors of any length in a direction perpendicular to the paper. This sketch, Fig. 1-*A*, can then be assumed to represent a cross section of a grounded telephone line and a neighboring disturbing wire.

The current flowing in the conductor connecting *B* with the earth will be proportional to the rate of charge of the voltage of *A* with respect to the earth. When *A* is the wire of the ground return telephone line, this induction gives rise to cross talk, which is commonly of considerable magnitude between circuits on the same pole line.

When *A* is a trolley wire, a direct current arc circuit wire, or an alternating current power circuit wire, the disturbance is of considerable magnitude, and gives rise to a distinct hum in the telephone receiver. The pitch of the hum is dependent on the frequency of the variation of the potential between *A* and the ground.

When the telephone line is metallic, the condition is as shown in Fig. 1-*B*, both lines being insulated from the earth but in metallic connection with each other. Line *B* will have a negative charge induced on it and line *C* a positive charge.

Whenever the potential between *A* and the ground varies, there will be a current flowing in the connection between *B* and *C*. This current will have a frequency determined by the frequency of the variation of the potential between *A* and the earth. The potential difference between the two lines will be dependent on the difference in the ratio of the capacities of *B* to *A* and to the earth and *C*, to *A* and to the earth.

Since the lines are customarily close together in comparison with their distance from the earth, the difference in these ratios is numerically small in comparison with one of the ratios. The disturbance is, therefore, much less for a metallic line than for a grounded line.

The disturbance can be practically eliminated by making the ratio of the capacities of *B* to *A* and to the earth equal to the ratio of the capacities of *C* to *A* and to the earth. This can be most easily accomplished by interchanging the positions of *B* and *C* at such points in the exposure to the disturbing wire that equal lengths of *B* and *C* are in each position. The interchanging of the wire positions is known as cutting in a transposition.

A transposed line having a single transposition is shown in Fig. 2-*A*, and one having three transpositions is shown in Fig. 2-*B*. An inspection of Fig. 2 shows that a portion of each telephone wire receives a positive charge, while the adjoining portion in the other position receives a negative charge. When these charges are being given to the wires, there will be a current flowing in each wire at the cross-over point and also through each receiver.

These currents will divide in inverse proportion to the receiver and wire impedances.

Transposition can therefore never entirely overcome interference due to static induction; but it serves to reduce it to a negligible amount if the distances between transposition sections are so short that the impedance of the wire in one of these sections is small in comparison with the impedance of the telephone. The customary distance between transposition points in open wire lines is from one-quarter of a mile to two miles.

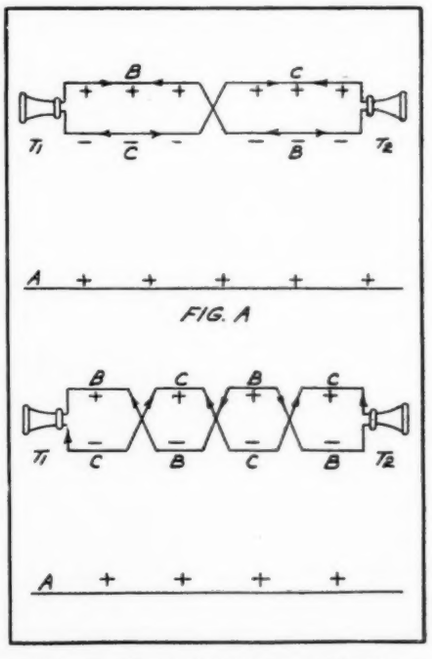

Fig. 2. Transpositions and Charge Conditions.

Another way to reduce the static induction on a metallic circuit is to place

the two wires of the circuit close together. This distance is customarily 10 inches in open-wire lines, as a smaller separation allows the wires to swing together. The wires may have the distance between them

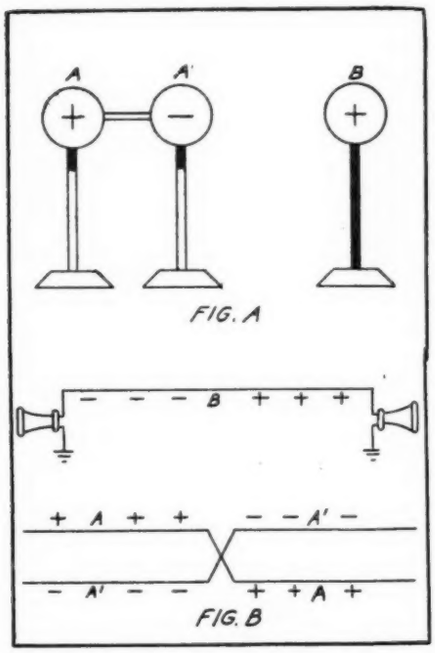

Fig. 3. Insulated Disturbing Circuit, Grounded Circuit.

reduced to a very small amount where cables are used. The use of cables made up of twisted pairs reduces the interference to an entirely negligible amount.

The neutralization of static induction by means of transposition requires that the telephone circuit be perfectly insulated, for the potential between a single wire and the ground is the same for a metallic circuit as for a grounded circuit. The grounding of one wire will therefore reduce a metallic circuit to the equivalent of a grounded one, so far as electrostatic induction is concerned.

In a grounded telephone circuit, when the disturbing circuit consists of two wires, A and A' (Fig. 3-A) insulated, one of the wires will be positive to ground and the other will be negative to ground. The charge on B will therefore be much reduced, it being the difference of the charges which would be produced by either of the potentials of A or A' to ground acting alone.

This neutralization to be most effective requires that the wires, A and A', be near together and be at the same potential to ground except that one is positive when the other is negative. This condition can be met in alternating current lines only in case that the lines, A and A', have equal capacity to earth or else have the neutral point of the transformers connecting them connected to earth.

The interference can be still further reduced by transposing the two conductors of the power transmission line, as shown in Fig. 3-B. Precaution must be taken to locate the transposition point, or points, so that the exposure is divided up into an even number of points.

When the power line is a three-phase line, as shown in Fig. 4, the problem of balancing the line becomes more difficult, necessitating the transposition of the power transmission line through its entire length in order to have the capacity of each conductor to ground equal to that of the others.

Transpositions along the exposure must be so placed that the distance is divided equally in multiples of three. The neutralization of the disturbance due to a single phase tap, without an insulating transformer, on a three-phase system, cannot be made so complete as in the case of an isolated single phase line, because the phases of the two potentials to ground differ by less than 180 degrees.

Interference from static induction, due to insulated power lines, can be reduced by making the telephone line metallic and transposing the telephone wires just as in the case of a grounded power line. Care must be taken in planning the transpositions that the transposition points of the two systems are co-ordinated.

The transposition points of the telephone line must be so located that each length of the parallel between power line transposition points will be divided into an even number of equal sections by the transposition points on the telephone line. In general, it is advisable to have no transpositions of the power line within

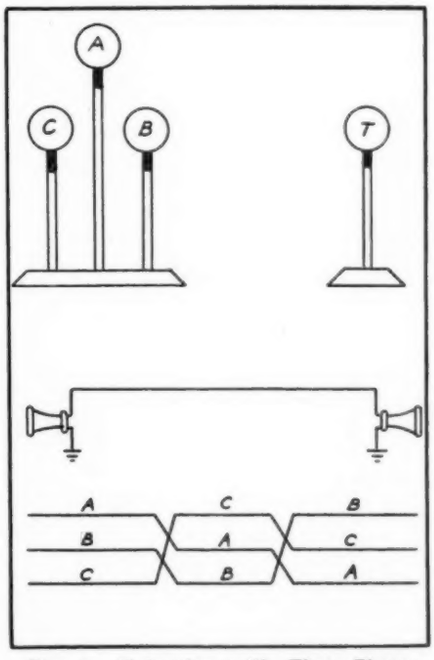

Fig. 4. Balancing with Three-Phase Circuit.

the exposure unless it has a length of from six to ten miles.

Whenever an electric circuit carries a current, it is surrounded by a magnetic field which varies in intensity with the current producing it. A neighboring circuit cut by this field will have an electromotive force induced in it as shown in Fig. 5-A.

The magnitude of the interference due to electromagnetic induction varies directly with the magnitude of the current

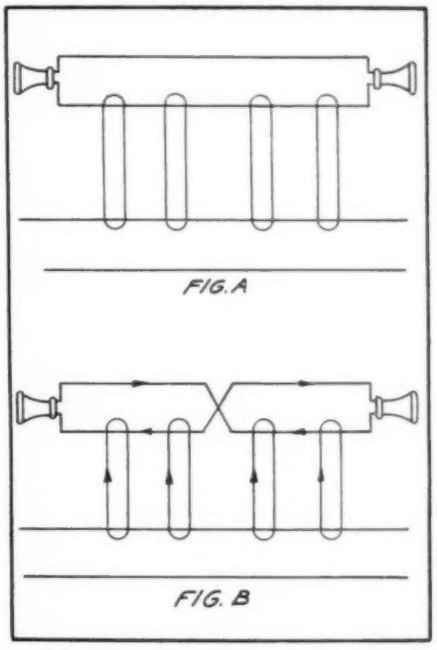

Fig. 5. Electromagnetic Induction and Transposition to Overcome It.

and the separation of the wires of each circuit and inversely with the separation of circuits. It can be overcome by transposing the circuits in the same manner as is required to overcome static induction. This is shown in Fig. 5-B, where it is seen that the magnetism set up by the power line threads through one end of the telephone circuit in one direction and through the other end of the circuit in the opposite direction, thus producing electromotive forces which exactly neutralize each other.

It is to be noted in passing that the effects of electromagnetic induction are small in value as compared with the effects of electrostatic induction, unless the power being transmitted over the line is such that the line current is very large. There are practically no power transmission lines in Iowa where the power transmitted is large enough to make the effects of electromagnetic induction at all comparable with those of static induction.

The pitch of the hum produced by a telephone connected to a line paralleled by a power line is determined by the frequency of the alternating current in the power line, which frequency is fundamentally of either 25 or 60 cycles per second.

It is a well known fact, however, that a large number of electric generators give electromotive force waves which are not simple harmonics, but which contain the odd-numbered harmonics of the fundamental. A sample electromotive force wave of such a machine is shown at A in Fig. 6, where it may be compared with a

simple harmonic electromotive force wave of a machine having essentially a simple harmonic wave as shown at *B* of Fig. 6.

The interference of a steady hum with conversation is a factor of the pitch of the hum, being a maximum for a pitch somewhere between 600 and 800 cycles per second. The interference with speech produced by a generator having the wave form shown at *A*, Fig. 6, will, therefore, be much greater than the interference produced by a generator having a wave form as shown in *B*, when they deliver power to the same circuit. It is, therefore, advisable to use generators having wave forms as nearly a simple harmonic as possible. In fact, a 25-cycle generator, giving simple harmonic waves, causes practically no objectionable interference with a neighboring telephone line.

Inductive interference is practically always present when telephone lines and power lines parallel each other for distances of one mile or more at separations of 50 feet or less, this being the customary separation of the circuits where both follow the country roads.

Inductive interference with grounded telephone lines can be much reduced by transposing the power lines throughout their length, so that all wires have the same capacity to earth, and then transposing the power wires within the limits of the parallel so as to produce a number of sections of power line of equal length and divisible by three, in the case of a three-phase line and two in the case of a single phase line.

Another way to reduce the interference

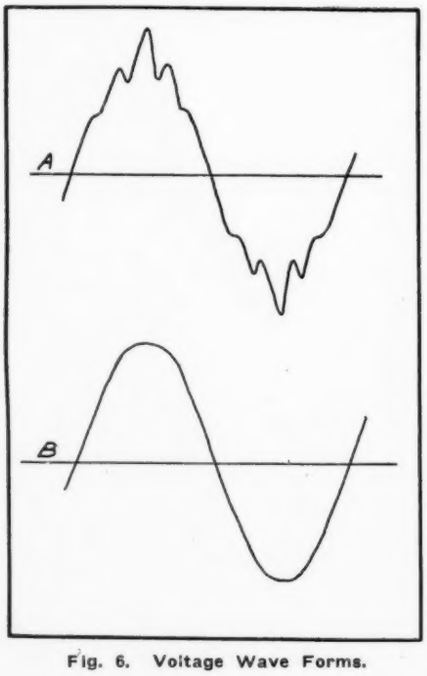

Fig. 6. Voltage Wave Forms.

with ground return lines is to make them metallic throughout the parallel, with repeating coils at the ends of the parallel, as shown in Fig. 7-*A*. This cannot be used on heavily-loaded party lines because of the inability of the ringing generator to ring bells through such a coil.

Still another way to reduce the interference is to string a second wire parallel to and near the line wire throughout the

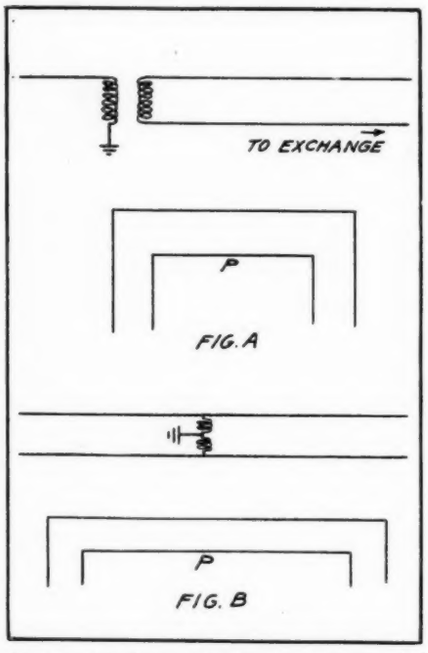

Fig. 7. Interference Reduction on Grounded Lines.

parallel and connect the two wires by a drainage coil having the center point connected to the earth, as shown in Fig. 7-*B*. This drainage coil acts as a low impedance shunt to charges induced on both lines at once, but has a high impedance to currents passing along a single line wire.

Where the exposure is between a power line and a metallic circuit telephone line, the power line should be transposed throughout its length so that each wire will have the same capacity to earth as the other wires, there being no transpositions within the limits of the parallel, unless the parallel has a length greater than six or eight miles. The telephone line should be transposed within the parallel at such points as to cut it up into an even number of sections having equal lengths.

The transposition requirements for reducing interference with a ground return line are such that, if they are met by transposing the power line, the necessary transposition in a parallel metallic circuit telephone line will be greatly increased. Where both ground return and metallic circuit telephone lines are involved in the same parallel, it is well to make a careful estimate of the comparative cost of transposing the power line and metallic circuit telephone lines, and of making the ground return telephone lines metallic. It may frequently happen that the cheaper way to get satisfactory service will be to make the ground return lines metallic if they are few in number in comparison with the metallic lines.

The insulation of both the power line and the telephone line should be as nearly perfect as possible. No connections should be made between the telephone line and earth, except such as are made at the center of an impedance coil.

The reduction of inductive interference with grounded telephone lines to a point where such lines are entirely satisfactory for toll service has not yet been accomplished, so all lines which are to be used for long distance toll service should be made metallic when they parallel high potential power lines.

Comparison of Rates in Cities the Size of Grand Rapids.

The Citizens Telephone Co., of Grand Rapids, Mich., in connection with its contemplated request of the state railroad commission and the Grand Rapids city commission for permission to increase its rates, has collected figures on telephone rates in cities approximately the size of Grand Rapids to show that that city has exceptionally low rates.

The table of rates shows:

Albany, population 100,253, business rate $60, residence rate $36.

Birmingham, population 132,685, business rate $72, residence rate $36.

Bridgeport, population 102,052, business rate $84, residence rate $36.

Cambridge, population 104,839, business rate $90, residence rate $42.

Grand Rapids, population 112,571, business rate $36, residence rate $24.

Lowell, population 116,294, business rate $57, residence rate $33.

Nashville, population 110,364, business rate $72, residence rate $36.

Omaha, population 124,096, business rate $84, residence rate $36.

Richmond, population 127,628, business rate $72, residence rate $36.

Syracuse, population 137,249, business rate $60, residence rate $36.

Business telephones in Grand Rapids cost $36 a year within one mile of Campau square, and $2 for each additional quarter of a mile.

What increases are desired have not been determined.

Annual Report of Porto Rico Telephone Co. for 1916.

The annual statement of the Porto Rico Telephone Co., just issued to stockholders, for the year ended December 31, 1916, reports gross revenues of $267,283 as against $228,228 in 1915, and net profits, after deducting all fixed charges of $62,528, as compared with $49,336.

The company's lines connect 64 towns and cities and average about 40,000 local calls a day, while the grand total of all calls in 1916 was 18,300,000.

Dividends on the $300,000 preferred stock are paid at the rate of 8 per cent. annually, and last year the $600,000 common stock was placed on a 4 per cent. per annum basis.

Alabama

"Here We Rest"—Some Comments

By J. C. Kelsey

"Alabama!" It was the voice of an Indian chief. Not the ordinary Indian chief, but a proud chieftain who had been driven from Mexico by the hand of Cortez, and his army, small but wonderfully equipped when compared to Montezuma's arrows and spears.

This Aztec chieftain and his tribe were seeking a home, a refuge, a place of worship, just as your Puritan forefathers were doing about 1620. Arriving at the banks of a broad and majestic river, with high banks and fertile lands on each side, he drove his spear into the ground, saying "Alabama!" or "Here we rest."

But this great Aztec chief was wrong—he only thought he was going to rest. As you learn the names of the tribes, seeking to rest in peace, you will realize that the cruel hand of the Spaniard was not the only agency of his unrest—there were other hands closer to home.

Read the names of the tribes—Muscogees, Choctas, and Chicasas—then cast your mind to Oklahoma, where the names of Muskogee, Chickasha and Choctaw are as familiar as Smith and Jones. You will see that the great American citizen finally disposed of these once great independent peoples—possibly as deserving as the Puritans—cheated them out of their lands and made them wards of the nation.

Cortez uprooted the Muscogees, Chicasas and Choctas. Later Ferdinand De Soto disturbed them further, and Oklahoma finally absorbed what was left of them, a few hundred years later.

For many years these great tribes hunted and fished in peace—no palefaces came to make them uneasy. But they were not to rest, because a new trouble was on the way. That trouble was Ferdinand De Soto, who, in May, 1539, landed at Tampa Bay, and camped where now a great Independent telephone company operates under the guidance of W. G. Brorein.

De Soto went north and wintered at a place which is now Tallahassee, the capital of Florida, and the home of another Independent telephone man, Dr. W. L. Moor. When spring came, De Soto came to a place which is now Rome, Ga.—a thriving city. It was here that De Soto met the refugees from Mexico, then under a wise chief called Tuskaloosa.

Tuskaloosa had all the facts and traditions of the Cortez invasion in mind, and he planned to settle De Soto in a truly Spanish manner—quite different from what De Soto suspected. Tuskaloosa invited De Soto to Piachee, now Selma, Ala., telling him of the gold he was seeking.

As soon as he arrived, the ambuscade was begun. It was the bloodiest Indian battle in history, because the firearms of the Spaniards left 2,500 Indian warriors dead on the field of battle, while but 18 Spaniards succumbed to bows and arrows of the Indians.

De Soto went on westward and ran into the fourth great tribe that had left Mexico, the Alibamas. They were well entrenched at what is now Yazoo, Miss. De Soto failed to dislodge them—in fact, he did the obvious German trick of leaving Verdun behind—and went on, only to be stricken with death near the mouth of the Arkansas River.

The Indians were terribly scattered, but managed to live on uninterruptedly for 160 years, for during that period no white man came. The Choctaws, Muskogees, Chickashas certainly had a long rest in this serene country north of Mobile Bay, where there was never lack of fish or game to worry them.

In 1699, some Frenchmen stopped at Penascola. In March, 1711, they advanced to Mobile, now the home of William H. Bryant, vice-president of our national telephone association.

General Brinville built a fort and prepared to resist the Spaniards who still laid claim to the territory. However, in 1763, England settled all the trouble in the Anglo Saxon way by annexing the territory and leaving France with nothing but the Louisiana territory, now our Middle West. The Revolutionary war played little part in the lives of the people, neither did the war of 1812, and Alabama finally mustered up enough importance to become a territory in 1817.

In the land of sunshine and serenity, great plantations thrived. The negro sang contentedly in the cotton field, and, as the years passed, pleasure became the only pursuit in life. The horrible years to come had so far showed no indication of their coming—no shadows were cast before. But a change was to take place.

Joy gave way to sorrow, and wealth quickly passed to poverty. Many a family became dependent upon those who had been their slaves. The northern invader struck hard in his war of attrition, and no one was spared; in fact histories written here indicate that our blue-coated boys were very careless of these peoples' property. But, as General Sherman said, "War was not heaven," he could only be sorry it all had to be.

At this time Alabama had 562,000 white people. To those who shudder at the conscription of all men between 20 and 31, think of this: Alabama sent 122,000 men to the war, and that means that every able-bodied white man went. It was not a question of a man in the twenties, but a question of every man going, and leaving his family to their fate.

Out of these 122,000 men who went out for the Gray, but 80,000 returned to the scenes of their ruined homes. Even until 1870, the white population was 521,000 and after five years, had not made a gain of a single man of the 40,000 Alabama men who dot our cemeteries at Shiloh, Stone River, and other burial places of our heroes.

Just to illustrate, I want to tell you the story of the gallant Eighth Alabama—they were all gallant, but this particular regiment was the first to enlist for all the war. After the battles of Williamsburg, Seven Pines, Gaines' Mill and Frazier's Farm only 99 men out of this regiment could respond to roll call.

After it had been recruited to strength, it was sent north, and it saw some real fighting. It lost 60 men at Manassas, 67 men at Sharpsburg, 58 men at Salem Church, and left 260 men dead on the great crucial field of Gettysburg. But that was not enough for this group of men.

They shared in the battles of Spotsylvania, Wilderness, Cold Harbor—where 10,000 men died in an hour—Petersburg, Deep Bottom, and finally surrendered at Appomattox—in at the death as it were.

Out of 1,375 men, but 664 returned to their ruined plantations to begin life under new conditions.

People say that the South would have been compelled to free the slaves for sheer economic reasons, because under present-day conditions a plantation using 200 slaves would not be able to sustain itself. However, Alabama set out to spend many weary years in reconstruction, and trying to heal the sores of countless wounds.

On top of this came the greenback period and the panic of 1873. It left the returned soldiers and their families about as helpless as can be imagined.

As late as 1880, Alabama had not begun to learn of her natural resources. In her hills are almost everything use-

ful to the human race, even including the gold and silver for which De Soto hunted so eagerly.

At this time, the total manufacturing output of the whole state was $13,500,000 per year—just about six weeks' output for some of our great factories today. Now the factory output, from steel rails down, runs nearer $200,000,000 a year, while the wealth of the state exceeds the Liberty Loan of a few days ago.

To those who know the Middle West, the average state is a great deal alike, but Alabama has three distinct parts. The upper part belongs to the Tennessee river, and is a rich valley or plateau where live stock and grain thrive. At the southern rim of this plateau is a low ridge of mountains which contains the richest deposit of iron, coal and marble in the world.

The middle part is the cotton or blackbelt district, a bit of prairie land lying between the ore-laden hills and the Gulf Coast country.

The lower part belongs to the breezes of the gulf, a climate which grows oranges, and gives truck gardens a superiority over all others.

Back in the ages before man even lived, Nature was at work in man's interest. If one stops one moment to think, he must realize that Nature spent lots of time getting this human house in order for our coming. Nothing but divine foresight or something out of human ken would design a valley in which one side contained iron, the other coking coal, and in the valley placed the limestone rock for their proper conversion.

At Pittsburgh one may wonder, yet he knows that the ore comes from Lake Superior lands, and the coke from Uniontown, but at Birmingham it all comes from within reach of the human hand. Millions of years ago, nature knew the secret of steel, and gave it to Alabama.

We are all familiar with the coal fields of Pennsylvania and Ohio. We can imagine a triangle in which Ohio and Pennsylvania form the base. As one goes south, through Kentucky and West Virginia, the fields narrow down and come to an apex in the Alabama hills. No part of the United States outside of this triangle, has such coal—it lies in one great pocket west of the Alleghenies.

Telephone men from Iowa, Kansas, Nebraska and Illinois must know that it was here that Walker Dunson, a boy, raised 232 bushels of corn on one lone acre. But they should not become discouraged because not all the acres have such yield, even though 50 inches of rain falls annually as expected. Walker Dunson made his record on alluvial soil under extraordinary conditions, but it is some feat just the same.

The great problem of our Middle West is to double and triple the yield.

In a telephone way, Alabama started out in a most promising fashion. Birmingham developed an exchange with 3,000 telephones, which connected with Mobile's Independent exchange, would have created the backbone of a great telephone system.

But the promoter, no friend of ours at all, showed his hand. He wanted to sell Birmingham and get his profit.

The state of Alabama had written on its constitutional records a law that no corporation should absorb its competitor. But nothing can daunt a promoter who is anxious to get away, and the rest was easy.

King Solomon, when he made the bluff at cutting the baby in two, in order to give each mother a half, had nothing on the Birmingham Home Telephone Co. This company just gave up its charter. It then had no right to call itself a competing telephone company. In fact, it could not describe itself as fish or fowl or anything but junk. Being junk, it continued to operate until the purchaser, the Southern Bell Telephone Co., junked the plant.

In the streets are comprehensive ducts, and in the principal street still stands a building with the legend across it—"Home Telephone Co." This building is still unsold, a monument to the value of state and national laws when men choose to circumvent or break them.

This Southern Bell Telephone Co. operates in North and South Carolina, Georgia, Florida and Alabamba. It operates 281 exchanges and connects with 1,072 Independent telephone exchanges owned and controlled by 812 Independent companies. Thus, one can see even in the South, the Independent telephone industry has been prone to underrate its strength.

Of course, it is not so preponderant as in Ohio, Indiana and Illinois where 1,000,000 Independent telephones compete or connect with 400,000 Bell telephones, but it is satisfactory enough.

Besides connecting with 1,072 Independent exchanges, the Southern Bell company connects with 2,113 rural telephone companies. This Southern company operates 188,500 telephones of its own, and connects with about 150,000 Independent stations. In addition, there are 30,000 Independent telephones which do not connect.

When we consider that Atlanta has 25,000 and Birmingham 15,000, it is evident that in the country at large the Independent telephone predominates.

It must be remembered, too, that the 188,500 telephones of the Southern Bell system have been paid for by Northern money. With all the money it needs, this company has not developed a system greater in numbers than the Independents who have had to beg or borrow at home.

It illustrates that condition of which TELEPHONY has spoken many times, whereby many Bell licensee companies would have been wiped off the face of the earth had it not been for help from the parent company. In fact, it is admitted that the very prosperous and well-managed Southern company would have been also ruined had not Northern money come into it.

We must enlarge upon our already great respect for the Southern Independent telephone man—he has done better than the world realizes.

One of the great fallacies encouraged by the Bell companies is that they must support the small communities at the expense of the larger ones. You will remember that the governor of New York just recently vetoed a telephone bill which even legalized the condition where a large city paid the loss of the small.

In other words, losing money at Terre Haute, Ind., would justify a greater charge at Chicago, where men are not so apt to notice the increase. Men in large cities are more careless of expense because they are borrowers—it is only the poor, thrifty fellow, who has actually earned or saved the money, who counts the cost.

The doctrine is bad, because putting a load on a willing horse gets to be a dangerous habit, as one overestimates the horse, finally. Besides, it betrays the very evident fact that today even yet the theory of charges for telephone service is still based on what the traffic will bear

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Anyway, Alabama is the place where I have rested, and I quite agree with the Aztec chief that he selected a great land. In fact, all our original settlers had good ideas, and they did not ask much.

I hope they have not lived in vain, in setting us a good example of courage and valour.

MORAL: Be glad that boys in the twenties are enough.

To Distribute Weather Forecasts.

For the benefit of agricultural interests, particularly with a view to increased production, the weekly United States weather forecasts supplied through the Minneapolis weather bureau will be distributed throughout that section of the state every Saturday without cost to the government by the Tri-State Telephone & Telegraph Co., of St. Paul, Minn.

Arrangements now are being completed, at the request of the Washington office, and the Tri-State company already has notified U. G. Purssell, Minneapolis weather forecaster, that its toll lines are at the government's disposal.

Southern Indiana Owners Meet

Enthusiastic Quarterly Meeting Held by the Southern Indiana Independent Telephone Association at Princeton, Ind., on June 19, with Nearly 70 in Attendance — A Real Get Together Meeting — Princeton Company the Host

A very interesting and enthusiastic quarterly meeting was held by the Southern Indiana Independent Telephone Owners Association on June 19, at Princeton, Ind., with between 60 and 70 in attendance.

After the meeting had been called to order by President S. M. Isom, of Mitchell, Ind., the address of welcome was made by Ernest E. Noble, president of the Princeton Chamber of Commerce. The response, on behalf of the association, was made by E. W. Swarthout, secretary of the Southern Indiana Telephone Co., Aurora, Ind.

Those in Attendance at Quarterly Meeting of the Southern Indiana Independent Telephone Owners' Association

The next speaker on the program was J. K. Johnston, of Indianapolis, Ind., who delivered an interesting address on "Going Value."

The subject of "Efficiency and Construction" was to have been discussed by L. C. Griffitts, president of the Seymour Mutual Telephone Co., Seymour, Ind., but in his absence several others were called upon to speak on the subject.

Vice-President Phillip Dilly, treasurer and manager of the Dubois County Telephone Co., Huntingburg, Ind., stated that, owing to the high price of materials, it is necessary that telephone companies ask for some relief through the public service commission. There was no definite action taken along this line, but it was evident from expressions of those present at the meeting, that the present telephone rates are not adequate, taking into consideration the cost of materials and labor.

M. F. Hosea, traffic manager of the Indianapolis Telephone Co., was called upon to tell of the automatic in Indianapolis. In the course of his remarks he said that many of the direct lines into Indianapolis are being operated by the automatic dial, which enables the main stations to dial Indianapolis direct or to dial through Indianapolis to connecting stations. This, he said, is high-class service, and the operators at the various exchanges are asking for automatic long distance service.

In order to give an idea as to the actual working conditions of this service, Mr. Hosea read a letter received from Geo. H. Davis, manager of the Rushville Co-Operative Telephone Co., Rushville, Ind., which is as follows:

"We have been using the long distance dialing circuit between Indianapolis and Rushville for one week, having dialed 210 toll calls, including quite a number of through calls to other towns, and the operators report that they have had but one instance in which they did not get the right number, and they are not sure, then, that they called the number right that time.

The transmission is very much more distinct, and as one subscriber put it, it 'sounds as though they were right in the same room with you.'

The operators are very much pleased with it, and say that there will be no need of tickets stacking up on their hands now, as they can handle them as fast as they come in.

We hope to see toll dialing become common in this part of the state, as we believe that it is going to be the solution for congested toll lines."

In speaking of the local service, Mr. Hosea stated that several thousand subscribers have been added to the present system since the cut-over in March, and that the prospect of the Indianapolis Telephone Co. is the brightest in its history.

C. E. Doolittle, traffic manager of the Citizens Independent Telephone Co., Terre Haute, Ind., followed Mr. Hosea with a talk on "Co-operation in the Operating Department," which was very well received by his audience.

Secretary-Treasurer F. R. Parrett, who is also manager of the Princeton Telephone Co., Princeton, Ind., made the necessary arrangements for the convenvention. Those in attendance will not soon forget the splendid luncheon he had arranged. Badges were supplied to the members present by Mr. Perrett.

The next meeting of the association will be held at Loogootee, Ind., on Tues-

day, October 9. The regular meeting was to be held in September, but, owing to the state convention being scheduled for that month, it was decided to have the meeting in October.

Following is a list of those in attendance:

Edwin Plummer, French Lick, Ind., manager, Star Telephone Co.; R. E. Pulliam, Louisville, Ky., Jas. Clark, Jr., Electric Co.; Henry Bishop, Mitchell, Ind., wire chief, Mitchell Telephone Co.; F. R. Cassidy, Hazelton, Ind., Hazelton Telephone Co.; Samuel Hargrove, Union, Ind., Union Telephone Co.; Alonzo E. Morrison, Hazelton, Ind., Kirksville Telephone Co.; Ernest E. Noble, Princeton, Ind., president, Chamber of Commerce.

D. J. Curran, Ralph E. Burton, James A. Luhring, Mrs. Cora K. Parrett, F. R. Parrett, Princeton, Ind., Princeton Telephone Co.; Wm. Knipe, Mt. Carmel, Ill., Mt. Carmel Telephone Co.; E. W. Swarthout, Aurora, Ind., Southern Indiana Telephone Co.; E. J. Landgrebe, Huntingburg, Ind., Dubois County Telephone Co.; Isom Ackerman, Loogootee, Ind., Loogootee Telephone Co.

A. L. Chill, Indianapolis, Ind., Indianapolis Electric Supply Co.; R. M. Craig, Otwell, Ind., Pike County Telephone Co.; A. H. Koerer, Huntingburg, Ind., Dubois County Telephone Co.; K. W. Montgomery, Harrisburg, Ill., Harrisburg Independent Telephone Co., and J. M. Himmsel, Jasper, Ind., Dubois County Telephone Co.

H. A. Robertson and M. J. Schlotterer, Evansville, Ind., Varney Electric Supply Co.; W. J. Perrine, St. Louis, Mo., Commercial Electric Supply Co., Mrs. H. A. Robertson, Evansville, Ind.; E. E. Whiting, Princeton, Ind., Kirksville Telephone Co.; M. F. Hosea, Indianapolis, Ind., Indianapolis Telephone Co.; Phillip Dilly, Huntingburg, Ind., Dubois County Telephone Co., and R. E. Weyler, Indianapolis, Ind., Manhattan Electric Supply Co.

E. O. Holly, Chicago, Central Electric Co.; H. W. Hogue, Indianapolis, Ind., Indiana representative for Leich Electric Co.; C. E. Doolittle, Terre Haute, Ind., Citizens Independent Telephone Co.; Zed Morton, Washington, Ind., Pike County Telephone Co.; E. W. Alexander, Oakland City, Ind., Oakland City Telephone Co.; W. H. Conlin, Madison, Wis., French Battery & Carbon Co.; H. C. Rothert, Huntingburg, Ind., Dubois County Telephone Co., and Earl P. Shafer, Indianapolis, Ind., Indiana representative for Stromberg-Carlson Telephone Mfg. Co.

Mrs. L. M. Schlotterer, Evansville, Ind.; H. H. Knipe, Olney, Ill., Commercial Telephone & Telegraph Co.; J. C. Flint, Mrs. J. C. Flint, and Truman Flint, Odon, Ind., Flint-Kyle Telephone Co.; Miss Pearl Boyd and Henry Landgrebe, Huntingburg, Ind., Dubois County Telephone Co.; C. C. Daughtery, Evansville, Ind., Varney Electric Supply Co., and J. K. Johnston, Indianapolis, Ind.

The Dakota Telephone Convention

Annual Meeting of North Dakota Telephone Association Held at Minot, N. D., June 21 and 22—Interesting Papers on Taxation, Commission Regulation and Other Subjects—Duties of Telephone Men in Signal Corps Explained

The eleventh annual convention of the North Dakota Telephone Association was held at Minot, N. D., on June 21 and 23. There was a large number in attendance and an interesting program was carried out. The following officers were re-elected for the ensuing year:

President, H. W. Wilson, of New Rockford.

Vice-President, J. P. Smith, of Beach.

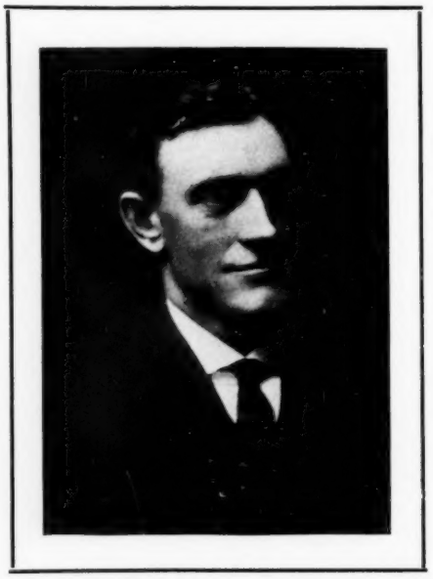
Secretary and treasurer, H. A. Livermore, of Fargo.

The convention opened Thursday afternoon, June 21, at 2 o'clock with the singing of "America," after which G. W. Wooledge, of Minot, delivered the address of welcome. The response, on behalf of the association, was made by C. E. Hall.

President Wilson, in his annual address, first briefly reviewed the history of the association. In referring to the demand for better service, the speaker stated that to meet this demand many of the telephone companies represented at the convention will either have to raise their rates or go out of business.

After discussing the question of taxation, President Wilson recommended the appointment of a committee to ascertain whether property returns are properly made out and filed; to attend the meetings of the board of equalization on the taxation of telephone companies; to present at such meetings the side of the telephone companies with respect to valuations; to make such investigations as will definitely determine whether telephone property is receiving fair consideration in valuation.

Touching upon the rural problem, the speaker urged closer co-operation with the farmer.



President H. W. Wilson.

He also spoke of the operators' school held recently at Bismarck, and the school in bookkeeping which is being conducted at Fargo.

In closing, President Wilson spoke of the work the telephone companies are called upon to do in the present national crisis, both in filling up the ranks in the signal corps and in keeping their telephone plants in the highest state of efficiency possible.

Following the president's address, the minutes of the previous meeting were read and approved, as was also the report of the secretary, and of the traffic committee. The audit and resolution committees were then appointed as follows:

Audit committee: Frank Delling, of Milton; J. G. Odegard, of Norwood, and J. F. Scudder, of Kenmare.

Resolutions committee: A. T. Nicklawsky, of Hillsboro; A. J. McInnes, of Dazey, and J. P. Smith, of Beach.

First Lieutenant D. B. Robinson, of Minneapolis, who has charge of the recruiting for two companies of the signal corps in the northwest, explained the duties of the men joining this branch of the service. According to Lieutenant Robinson, the war department has left the problem of recruiting signal companies to war strength to the telephone companies.

The northwest district is expected to raise two companies, he stated, and thus far has contributed but 59 men familiar with telephone service. One hundred and fifty-six are needed, he said, considering the number who will be rejected on account of physical defects.

Mobilization of these companies is not expected until September 1, or perhaps October, he announced.

Rev. Cecil Leslie Clifford, Minot's orator, the next speaker on the program, expressed the layman's view of the telephone and gave some interesting statistics on telephone service.

The telephone service in this country comprises 67.1 per cent. of all the telephone industry in the world, he said, and the millions of miles of wires used for telephonic communication, if stretched in one continuous line, would go around the world 700 times.

He declared that the telephone is a very necessary institution, but pointed out that it is not independent but dependent on the people. In this remark he showed the advantage of a closer relationship between the telephone companies and the patrons and predicted that the telephone would be the means of bringing together all the nations of the world in a socialized peace.

Short talks were then made by representatives of telephone manufacturers and supply houses. Among those who spoke were Jay Houghtaling, of the Northwestern Electric Equipment Co., St. Paul; V. A. Hoar, of the Northwestern Electric Co.; B. O. Horton, of the St. Paul Electric Co.; C. W. Schneider, of the Monarch Telephone Mfg. Co., and E. F. McCord, of the Stromberg-Carlson Mfg. Co. The speakers all advised regarding the prospects of prompt delivery on orders, and all agreed that it was not wise to do any speculative buying, but to anticipate requirements as far in advance as possible. The meeting then adjourned, and the members of the association were taken for a launch ride on the Souris river, and a picnic in the city park.

Friday Morning Session.

The first speaker at the Friday morning session was Frank E. Packard, chairman of the North Dakota Tax Commission, who spoke on "Telephone Taxation." In his remarks, he stated that the machinery for taxation in use at this time, while undoubtedly effective years ago, was not adapted to modern business methods, and it is very difficult to get proper assessments of property with the methods prescribed at the present time.

Mr. Packard gave as his opinion that the important factor in determining property for taxation purposes was its earning power, and that the physical valuation or cost of production should only be used to arrive at a minimum valuation when property was classed as non-productive.

The speaker also stated that the tax commission had a corps of engineers at work in the state appraising property of the various public utilities, and that up to the present time the engineers had had no difficulty whatever in obtaining access to the books and records of the telephone companies in the state, and any information or assistance which they required in locating the property of these companies for taxation purposes. It is the aim of the North Dakota Tax Commission, he said, to gather this data, and work out, if possible, a scientific basis for assessing telephone properties.

Vice-President J. P. Smith.

Mr. Packard's address was followed by considerable discussion on forms for making tax reports, method of reporting mileages, etc., after which the convention adjourned until the afternoon, the members being taken for an automobile ride to the Minot Normal School where they were entertained with a special program arranged by the graduating class.

The concluding session of the convent on was called to order at 2 o'clock, Friday afternoon, after which H. L. Reade, state fire marshal, delivered an address on the subject of "High Tension Lines." In his remarks, he spoke of the importance of telephone and telegraph lines being so constructed and maintained that they will be as far as possible independent of stresses and strains which may be unavoidably introduced into the portion of the ether which they occupy.

Mr. Reade presented quite a technical discussion of the subject, which was a summary of a paper by J. B. Taylor on "Telegraph and Telephone Systems as Affected by Alternating Current Lines," published in the 1916 Proceedings of the American Institute of Electrical Engineers.

M. P. Johnson, of the North Dakota Railroad Commission, was then called upon to speak on the subject of "Commission Regulation." He told of the factors leading up to state regulation of railroads and common carriers, and the later extension of this power to include telephone companies.

In speaking of the powers and duties of the North Dakota Railroad Commission, he said the state has apparently adopted the theory of regulated monoply in the field of telephone service. No new telephone line may be built without permission of the commission, and no permit may be issued by the commission when the proposed construction will duplicate any existing line unless it can be shown that the existing line is rendering inadequate or inefficient service.

With reference to the complications and dangers to life and property arising from power company circuits in relation to telephone lines, Mr. Johnson was of the opinion that it would be highly desirable to have some new legislation authorizing the proper authority to establish operating standards of construction, which will safeguard the lives and property of the public and the company's employes.

Report of Resolutions Committee.

At the conclusion of Mr. Johnson's address, the committee on resolutions made its report in which it recommended that the association appoint a committee to make investigation as to the proper valuation of telephone properties, and to appear before the state board of equalization at its annual meeting, and make such representation as seemed to them just and equitable. The committee also recommended that a committee on legislation be appointed to go over the various bills introduced in the session of the legislature, giving their recommendations on same to the members of the association. These resolutions were adopted and the following committees appointed.

Taxation committee: A. J. McInnes, of Dazey; J. G. Odegard, of Northwood, and H. A. Brown, of Cooperstown.

Legislative committee: M. M. Borman, of Abercrombie; A. T. Nicklawsky, of Hillsboro, and C. A. Edblom, of Minot.

A. J. McInnes, of Dazey, then conducted an interesting discussion of the questions in the question-box.

Following the election of officers, as previously given, the president appointed the following standing committees:

Executive committee: A. J. McInnes, of Dazey; M. M. Borman, of Abercrombie; W. F. Rusk, of Cando; J. G. Odegard, of Northwood, and H. A. Brown, of Cooperstown.

Membership committee: F. H. Gess, of Hunter; C. B. Cockrell, of Flaxton, and Frank Delling, of Milton.

Traffic committee: Paul A. Bunce, of Fargo; H. A. Brown, of Cooperstown, E. W. Chaffee, of Amenia.

After voting to hold the next meeting at Bismarck in the month of June, 1918, the exact date to be fixed by the executive committee, the convention adjourned.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—This Section, "Part VI, The Valuation of Telephone Properties," Written by Chas. W. McKay

Quiz Questions on the Preceding Installment.

200. Why has it become the almost universal practice to add a specific allowance to the reproduction cost of an inventoriable property to cover omissions? Discuss the importance of the preparation of unit costs?

201. By what time should each set of unit costs be completed?

202. What is the first step in the preparation of unit costs?

203. In the determination of corresponding prices for the several years preceding the appraisal, what data should be noted for each class of material?

204. Should the average prices for several years preceding the appraisal be used in all cases? Discuss. In the last analysis, upon what is the determination of fair material prices dependent?

205. What steps should be taken in determining the labor cost? What is a very practical source of unit cost information as regards labor?

206. What graphics will be of material help to the appraisal engineer?

207. Are appraisals made of public utility properties for other purposes than as a basis for rate making? Why is it well for the appraisal engineer to carefully verify the report of the land appraisal expert?

208. What arguments are presented as to the proper method of appraising land of a public utility corporation? What is the opinion of the courts on the subject of land value?

209. Name the two generally accepted methods of determining the value of land.

210. Discuss the "expert" method of land appraisal.

CHAPTER XII. Units Costs of Land and Equipment (Cont'd).

211. *Sales Method of Valuing Real Estate.*—In a decision, March 8, 1910, the Wisconsin Railroad Commission in the case of the State Journal Printing Co. vs. Madison Gas & Electric Co., discusses the sales method of valuing real estate. It says:

> The sales method of valuing real estate was used partially in the Michigan railway appraisals of 1900-1901, and in the light of the experience gained in that work the method was adopted in the Wisconsin steam road valuation made under the provisions of the ad valorem assessment law of 1903. It has since been extensively used in Wisconsin and elsewhere in connection with important valuations of public service properties for both rate-making and taxation purposes, and is generally accepted as a valuable aid to the judgment by experts engaged in such valuation work on a large scale.
>
> The sales method may be defined as a plan or process for the systematic collection and comparison of data relating to real estate transfers for the purpose of estimating true market realty values. It consists in a study of the transfers of neighboring property having conditions or characteristics similar to the land whose value is to be determined, and is intended to duplicate, as nearly as may be, the mental or judicial processes ordinarily employed by the so-called "local real estate expert," with a view to arriving at results approximating those which would be reached by such local expert acting without bias or suggestion.
>
> The sales method is capable of application in a variety of ways; in fact, is as flexible in its possible applications as are the varied methods employed by individual local experts. Two interpretations of the sales method have been most commonly employed. In one of these the area and consideration in each sale of similarly situated land is found, and the average unit price—per square foot, per foot frontage, per lot, per acre, etc. —ascertained, and this unit applied to the tract under investigation.
>
> The other application of the method introduces what, in many cases, is believed to be an additional safeguard, consisting of the use of the average assessed value of adjacent or similarly situated lands, in combination with an average ratio or percentage representing the relationship of the assessed value of transferred lands to the total consideration paid for such transferred lands in the district or locality under consideration, all of these figures being based on the "ground values" exclusive of the improvements thereon.
>
> Such use of assessment figures is designed to introduce, as far as may be, the results of the judicial processes of the assessor, who, at least in theory, serves on behalf of the public as an unbiased expert in the matter of relative valuations, and who attempts to make allowance for the peculiar attributes or characteristics of individual parcels of real estate in any given locality or neighborhood of a city.
>
> In the broader and more flexible applications of the sales method, the expert adopts one or the other of the processes just outlined, or blends the two together in such fashion as to yield the most consistent and trustworthy final result. In the process of valuing a tract of land involving conflicting data, as in the case under consideration, the expert user of the sales method on this flexible basis derives a series of tentative results similar to the results representing the judgments of individual local experts.
>
> The judicial function involved in the discriminating selection of data and in the derivation of final results, is exercised along essentially parallel lines with the two classes of experts here compared. The further act of the judgment in selecting a final preferred valuation figure in the light of a group of preliminary or tentative results is identical in the two cases.
>
> In the particular valuations here considered, the similarity of the basis is further emphasized by the fact that the results by the sales method represent the composite judgment of four members of the commission's expert staff, as against an equal number of local real estate experts employed by the company. Although it is frankly conceded that the tentative land valuation figures first reported were derived by a comparatively restricted application of the sales method, issue is here taken with certain claims made in the argument by counsel for company. In view of the repeated favorable reference by counsel to the judgment of the assessor with respect to relative values (Argument on behalf of company, pp. 30, 31, 32, 37, 39), the criticism of a similar use of the assessor's judgment by the commission's experts need scarcely be considered, except with respect to the misapprehension by counsel (argument, p. 43), as regards the fluctuation of the assessment ratio in Madison.
>
> Entirely aside from the claim that assessment ratios should not be depended upon in making land valuations, counsel contends that, in any event, a general assessment ratio should not be used in the case under consideration, chiefly because of a supposed "radical difference as between different sections or localities" in the city of Madison.

212. *Appraisement of Buildings, Account 212.*—The appraisement of the buildings, like that of the land, is usually relegated by courts and commissions to specialists, as has been previously stated Most of the state commissions take the stand that the appraisement of the buildings can be much better effected by architects or building contractors than by the appraisal engineer. With all due respect to the regulatory bodies which have established this precedent for building appraisals, it is rather unfair to the appraisal engineer.

Most engineers interested in telephone utility appraisement problems, are thoroughly familiar with the telephone business from a purely engineering stand-

point and are perfectly competent to estimate the cost of buildings used for telephone purposes. In fact, it is part of the job of the telephone engineer to be thoroughly posted on building matters. In most cases he is better able to estimate the cost of the special type of buildings usually required for telephone purposes than are most of the general contractors and architects.

There are so many variable factors entering into the appraisement of a telephone building that it is almost impossible to give accurate unit costs which may be used in building appraisement. Suffice it to say, it is possible to appraise a telephone building by estimating the cubic contents and applying a unit cost per cubic foot—this cost being dependent upon the type of building under consideration.

Buildings may also be appraised by applying a unit cost per square foot to each floor of the building. In the latter case, this unit cost per square foot would vary according to the general use to which the floor in question is put.

213. *Appraisement of Central Office Telephone Equipment, Account 221.*—The unit costs used in central office equipment are so largely dependent upon the exigencies of individual cases that it is practically out of the question to give any specific data.

As a general rule it may be said that the appraisement of telephone switchboards, frames and racks can be best effected by ascertaining the manufacturers' name and the type, ultimate capacity and present equipment of the apparatus in question and referring directly to the manufacturer for prices as of the appraisal date. These prices may subsequently be modified if, in the appraiser's judgment, they are unduly high due to some peculiar condition in the material or labor markets at the time of the appraisal.

214. *Other Equipment of Central Offices, Account 222.*—This account, it will be remembered, includes all furniture and equipment, other than telephone equipment, in the central office operating, retiring and lunchrooms, etc. A large part of this equipment consists simply of ordinary furniture, such as chairs, tables, etc., and prices can be readily obtained from the appraiser's files or from local dealers in equipment of the type under consideration.

215. *Appraisal of Station Apparatus, Account 231.*—The appraisal of the station apparatus, or subscribers' station instruments, should be prefaced by a careful review of telephone instrument prices as of the date of appraisal and for the several years preceding the appraisal. To conform with the Interstate Commerce Commission's accounting instructions only the price of the instrument should be included under the 231 account. All additional material and labor costs incurred in the installation of the instrument will be appraised under station installations, account 232.

In cases where it is impossible to segregate various types of instruments, i. e. wall, desk, etc., in the process of taking inventory, an allowance should be made in building up the unit cost per instrument for the fact that the instruments are probably not of one type. For instance, if after consultation with the plant authorities, it is found reasonable to assume that 75 per cent. of the instruments are of the hotel wall type, 15 per cent. of the desk type and 10 per cent. of the long-back wall type, the unit cost should be correspondingly weighted.

216. *Station Installations, Account 232.*—The station installation account, it will be recalled, covers the cost of all material and labor used in placing the telephone instrument on the subscriber's premises. To quote the Interstate Commerce Commission:

> This account should include the cost of installing station apparatus and the cost of inside wires; that is, the wires (or cables) from the instruments to the point of entrance to the building, where the drop wires or interior block wires terminate, or to the junction boxes, where the house cable or other cable terminates, including wires on the same premises to connect main and extension stations, or to connect the private branch exchange distributing frames with their terminal stations.

The following is an illustration of the computation of an installation unit cost as taken from a recent telephone appraisal:

1 fuse, @ .086	$0.0860
16 ft. inside wire, @ .01735 ft.	.2780
10 ft. duplex bridle wire, @ .0088 ft.	.0880
2 porcelain knobs, @ .00975 ea.	.0195
6 Perfection nails, @ .00085 ea.	.0051
8 screws, @ .00373 ea.	.0298
Total material	$0.5064
Total material plus 2 per cent. for waste and loss	.5165
Labor of installing	2.00
Total installation cost per station	$2.5165

217. *Interior Block Wires, Account 233.*—The determination of the unit costs for interior block wiring is rather a difficult problem. It may be effected either by arriving at a cost per foot placed of wiring along rear building walls and fences, or by estimating a cost per station fed by interior block wiring.

In either case, the unit costs should be derived by going over a number of work orders and determining the average span length of block wire and the average number of rings, etc., used in installation. In the same way an estimate may be made of the length of time necessary for installing a block wire of average length.

The unit costs should be derived in a manner similar to the one outlined in the preceding paragraph, under the heading "Station Installations."

218. *Private Branch Exchanges, Account 234.*—The private branch exchange account, it will be remembered, includes the cost of the switchboards, their distributing frames, the cables connecting such switchboards and distributing frames, and the cost of installation.

Unit costs for this type of equipment can best be arrived at by ascertaining from the manufacturer of the equipment in question the prices prevalent as of the appraisal date and making suitable additions for cost of installation.

219. *Booths and Special Fittings, Account 235.*—The Interstate Commerce Commission's accounting instructions specify that under account 235 shall be included the cost of booths and special fittings—such as desks, chairs, fans, cash registers—together with their respective installation costs.

It is hardly necessary to outline a specific method for arriving at the unit costs of equipment of this nature. It is only necessary to refer to manufacturer's catalogues and obtain reasonable material prices and make suitable additions to cover the probable installation costs.

(To be continued.)

Telephone Company Co-Operates in Forest Protection.

By the terms of an agreement entered into between the Bell Telephone Co. of Pennsylvania, and the state department of forestry, complete lists of the forest fire wardens in 56 counties of Pennsylvania will be published in 14 of the new telephone directories to be issued during the next few weeks.

The wardens will be listed by counties and townships on a page in the front advertising section of the directories. They will be indexed also under the heading "Forest Fire Wardens," and numbers and calls will be given for all lines which connect fire wardens, whether the lines are part of the Bell system or not.

This move is part of the campaign of the department of forestry to reduce the damage from forest fires by making it easy to turn in an alarm. Most of the fire wardens have telephones, and after the new directories come out there will be small excuse for anyone not reporting a forest fire immediately to the nearest warden.

Changes Ownership.

The Northwood (Iowa) Telephone Co. has been sold to the Western Electric Telephone Co., of Mason City, Iowa. Until its sale less than a year ago to A. L. Dodd, of Charles City, the Northwood company was owned by local capital.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Effort to Secure Reversal of Ruling on Inductive Interference.

Representatives of the high voltage transmission companies in Iowa are now making an effort to secure a reversal from the railroad commission's order requiring these companies to bear the expense of putting in metallic circuits on telephone lines whose efficiency has been substantially interfered with by the high tension line. Arguments on the rehearing were heard on June 21.

The order of the state railroad commission, dated December 30, 1916, was made after an extensive hearing on this issue. The original hearing was held in March, 1916. High power electric transmission lines are spreading rapidly over the state. The order of the commission grew out the fact that in numerous instances, where high power electric transmission lines were put on the same highway with rural telephone lines, the rural line was practically made useless because of the inductive interference of the high voltage current. According to the printed evidence on this first hearing it was established that interference of a substantial character usually results from a close parallelism of a transmission line with a telephone line for a considerable distance, unless the two lines are separated by at least the width of the highway or the telephone line is on a metallic circuit, the wires of the two lines properly transposed with relation to each other and both lines are properly constructed and in good condition.

In the order as rendered by the commission, Commissioner John A. Guiher dissented from the majority opinion as taken by Commissioners Thorne and Chassell. Commissioner Guiher, in stating his position, among other things, said:

"A person may use any kind of telephone apparatus he wishes, so long as his line is in a community in which there are no other electric lines. But it certainly cannot be right for a person to use the equipment which is least efficient in overcoming electrical interference and then because he happens to be on the highway first, require other people who have modern equipment to stay out of the highway or pay the expense of making his plant modern. Such action, if permitted, is equivalent in principle to giving an exclusive right to the use of the highway. If by reason of its prior occupancy a grounded telephone line using the highway is authorized by this commission to say to another electric line which is properly equipped with modern appliances, and which, in its operation incidentally affects the telephone, it must either remove from the highway or pay the expense of putting the telephone line in such condition that it will not be affected, we therefore, allow such a telephone line to become an obstruction to the highway. It will stand in the way of improvement and progress."

Hearing on Long Distance Bell Connections in Canada.

The matter of long distance Bell connections for Canadian Independent telephone companies is in line to be put into a better condition as the result of a hearing before the special parliamentary committee on revision of the railway act. Clause 375 of the act is likely to be so amended as to meet in some degree at least the wishes of the Independents.

This section of the act gave the dominion board of railway commissioners authority to grant long distance connection to companies, and it said "on such terms and compensation as the board deems fit."

The Independent companies of Canada put in an application to have this clause amended by striking out the words "long distance" in that section, and the word "compensation." The desire was that the clause should give all companies local and long distance connection on more reasonable terms than are now in force in some places.

The Independents appended two subsections, one of which said that notwithstanding anything in the previous clause the railway board in fixing terms (they were willing to allow the railway board to fix certain terms) was to take into consideration only the actual cost of carrying the lines of the Independent company through the Bell switchboard, i. e., making the physical connection. And long distance service was to be given at the regular long distance rates. That meant that it would take it out of the hands of the board to impose anything over and above long distance rates.

They did not get exactly all that they wanted, viz., that long distance rates would be all that anyone would have to pay.

The second amendment was to provide that the members of the dominion and the provincial railway boards should hear matters affecting local connections, i. e., connections for a rural company with its market town. Up to the present time the Bell company has been empowered to give connection for a company, say, with Newmarket, for example, or could refuse it if the local company did not accept the terms the Bell proposed; consequently the Bell could impose practically what terms it liked.

The Independents proposed, through the Ontario government, to have a joint board for such cases.

The executive board of the Ontario Independent Telephone Association was represented in the hearing before the parliamentary committee at Ottawa, all its members except three being present. Among them were President F. S. Scott, of Brussels, and T. R. Mayberry, for North Oxford. Francis Dagger, secretary of the association, and telephone expert of the Ontario Railway and Municipal Board, was present as representing the Ontario government. F. D. Mackay, treasurer of the association, was spokesman for the deputation.

The committee was apparently from the first opposed to a joint board, being seemingly loth to take any power from the dominion board and hand it over to the provincial board.

The Bell company was represented by General Manager Sise, Ontario District Manager Kenneth J. Dunstan, and Mr. Geoffrion, a Montreal lawyer.

The Bell people intimated that so far as local connection was concerned they were pretty well ready to meet the Independents. Local connection is now compulsory, and the Bell must give it, so far as relates to non-competing companies, and in the case of non-competing parts of competing companies the terms and conditions are left to the railway board. The Bell accepted that, so the fight centered around the matter of long distance connection. The company opposed this vigorously, claiming that it was most unfair.

The Bell people asked a committee of the association to meet with a committee of Bell representatives. This was done, but the conference did not result in getting them ahead. The Bell insisted on compensation for long distance connection and would not discuss anything for competing companies.

The committee sent the matter over for two weeks. The Independents argued their amendments regarding local connection and met all the Bell claims on that part of the dispute.

The discussion took up all the afternoon session and the decision went over

to the next morning. An amendment was proposed by the board's legal representative, which, however, gave the Independents no relief at all so far as compensation was concerned. The committee then voted to strike out the compensation.

This leaves the terms and conditions in the hands of the railway board. Just what view the board will take will remain to be seen when an application is made to it.

The difference between what the Independents got and what they asked for as regards long distance is, that if they had obtained their amendment the railway board would have nothing to do with terms and conditions so far as charges are concerned and would have only to satisfy itself as to standard equipment of the company applying, and fixing the expense of physical connection; the charge would be fixed by the act. As it is now, the terms and conditions are left to the railway board without any instructions, and it might say, for example, that there shall be a 15-cent surcharge.

The Bell used the greatest influence to get the whole matter opened up again, but the committee was quite sympathetic to the Independents. The bill is still before the house.

Taking of Evidence in Colorado Rate Case Completed.

After two years of work, the last evidence in the hearing of the Colorado Public Utilities Commission on the valuation and rates of the Mountain States Telephone & Telegraph Co., in Colorado, was concluded June 26.

The evidence was concluded by testimony of L. C. Gomez, telephone expert for the commission, on the rules and service of the company. Since June, 1915, the commission has intermittently taken evidence in the hearing, which has been one of the most exhaustive of its kind ever held in the country. On January 5 of this year it fixed a valuation of $14,690,794 on the company's Colorado property. Since then it has been taking testimony as to the rates, service and practices of the company.

Now that the evidence is concluded, the commission will digest it, and will announce the rates it finds should be in force in Colorado as reasonable payment for telephone service. At the same time it will announce rules regarding the service which it will order established.

Suit to Compel Forfeiture of Chicago Automatic Property.

A petition for a writ of mandamus to compel the Chicago council committee on gas, oil and electric light to take proper legal steps toward the forfeiture of the property rights and franchise of the automatic telephone system was filed in the circuit court by Morton L. Johnson, secretary of the Chicago Municipal Ownership League, through his attorney, Fayette S. Munro. The petition relates that the city council on December 20, 1916, ordered the committee, whose chairman is Thomas J. Lynch, to take the action demanded in the petition.

The Illinois Telephone & Telegraph Co., the original owner of the automatic telephone system, was required by a city ordinance passed in February, 1889, to have 20,000 subscribers within five years after its organization or forfeit the franchise, states the petition. In February, 1909, the company was given until October 8, 1909, to get the necessary subscribers. Later the time was extended to June, 1911, but the action against the system did not come until December 20, 1916, when the council is said to have ordered the committee to take the necessary legal action toward the securing of the rights of the city of Chicago in the telephone property, which is now owned by the Chicago Tunnel Co.

Company Not Required to Make Unprofitable Extensions.

Two reasons were given by the Nebraska State Railway Commission in holding that telephone companies need not build excess construction in rural communities to furnish service for persons desiring it.

One was that it was inequitable to those whose service needs were met by ordinary construction in that in the end they must help pay the cost of the excess construction. The other is that there is no obligation upon a company to do so when there is no immediate possibility of proper returns.

The matter came before the commission on a complaint from farmers in the Loup river country, served by the Nebraska Telephone Co., that they were unable to get service except upon terms they believed to be onerous and excessive.

The company replied that it was willing to build a quarter of a mile from an existing line in order to furnish service, but beyond that the subscriber should pay the excess cost. It objected to investing $50 or $100 in building a line to an isolated farmhouse when there was no certainty of continuous service being desired.

It pointed out that one of the applicants for service desired an instrument installed in a farmhouse from which the company had only a month previous removed a telephone and had since torn down the pole line, upon the discontinuance order of the previous occupant.

The commission held that the company was entitled to adequate revenue upon its investment, and approved of its proposition that under such circumstances it should be paid five years in advance or guaranteed against the discontinuance of service before the end of that period.

The same principle was applied in the application of the Farmers Elevator Co., of Rohrs, for individual line service from Johnson and Auburn. The company now has party-line service, but this is unsatisfactory. The Auburn Telephone Co. declined to run new lines to Rohrs for individual line service unless the company signed a five-year contract.

The commission held that the position was well taken, on the theory that a change in managers at the elevator might be followed by a change to a lower grade of service, and thus render the investment useless.

Installation of Telephones in Nebraska Railway Depots.

The Nebraska State Railway Commission has held, in the complaint of E. A. Rogers, that a railroad company cannot be compelled to place and maintain a telephone in a depot in a town where there is no telephone exchange. Mr. Rogers is a wealthy land owner of Lincoln, who owns farm lands near Prairie Home, in the same county. He complained that he could not secure information as to trains out of Prairie Home from his farm because the company would not put a telephone in its depot.

The Nebraska law reads: "Every railroad company, express or telegraph company, doing business in the state shall furnish reasonably adequate telephone connections between its offices, buildings and grounds, and the public telephone exchanges operated in the towns where the same are located."

The commission held that the legislature evidently contemplated the placing of telephones for the convenience of the townspeople, since it required connection with the exchanges operated in the town. Another section in the law says that where such service cannot be had, the commission shall make provision therefor, but owing to the ambiguous and peculiar wording thereof it was disregarded.

Cannot Revert Back to Mutual Form of Organization.

The Nebraska State Railway Commission has ruled that a mutual company, after having once entered the field of general telephone service, cannot again become a mutual, having made such a course impossible. The fact also that it offers toll service open to the general public takes it out of the field of mutual companies.

The matter came before it on the application of the Glenwood Telephone Co. The commission recently ordered, after a consultation with its officers, that it must cease discrimination in rates, that discrimination consisting of charging renters from a third to a half more than stockholders who had furnished their own

WHICH DO Y
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"Because the lone operator employed at the switchboard in the little town of —— takes an hour off for lunch at noon on Sunday, complaint has been filed with the State Railway Commission. The complainant urges that telephone service be given continuously."—*Recent news item typical of hundreds of other villages.*

There was a time when telephone su rib
were glad to get any sort of telephon erv
prompt, reliable, *continuous* operation, a ar

To give this kind of service with manu equ

THE AUTOMATIC SC

50 or 100-line Automatic units, installed in the villages su ur
instant, reliable and continuous service *at less cost* than th re

All local connections are made automatically, while calls t th
distance, are trunked to the operator at the main exchang

If you are operating small branch exchanges, let us show u
and reduce operating costs.

Automatic Electric C

Makers of over 1,000,000 Autom

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

OU PREFER?

THIS

"It was found that The Glidden Telephone Company had installed a complete Automatic equipment. Questioned as to an increase in rates, the subscribers were perfectly willing to pay more for the better service extended over the 24-hour day."—*From Wisconsin R. R. Commission decision granting application for higher rates.*

ribers in rural districts and villages
ervice. Today they are insisting on
are willing to fight—and pay—for it.
equipment is prohibitive in cost, but—

LVES THE PROBLEM

unding the main exchange (Automatic or manual) give
present partial service of the manual system.
the main exchange subscribers, other villages or long

u how you can improve your service, adjust your rates,

Company, Chicago

Telephones in use the world over

instruments. The company was given until the first of the year to make the change.

The announcement to the stockholders thus favored in rates was greeted with a storm of protests. These were so many and so strong that the manager wrote in asking if the company could be permitted to change back to a mutual upon giving notice to renters that the sale of service would cease on September 1. The commission ruled that as this would result in the cutting off of service to the renters who did not desire to become stockholders, it could not be permitted, and that having once become a seller of service it could not revert back to the mutual form of doing business.

Receiver Named for Home Company of Portland, Oregon.

The appointment of Oswald West, ex-governor of Oregon, as receiver of the Home Telephone & Telegraph Co., of Portland, Ore., by Federal Judge Wolverton, on June 22, followed the granting of an application by Samuel Hill, ex-president and director of the company, that it be placed under a receiver to protect his interests.

Mr. Hill's application for a receiver was friendly and taken with the full approval of officers of the Home company. It was based on an unpaid promissory note for $50,000, advanced by Mr. Hill to the company on August 10, 1914, on which neither interest nor principal has been met.

In his complaint Mr. Hill alleged that the company is unable to pay the note, and that it is indebted in large sums to other persons whom it is unable to pay. To save the company from being injured by efforts of its creditors to collect from it, which he alleged would result in the closing of the plant, he asked the appointment of a receiver.

Mr. Hill also declared that in the past few months the company has largely increased its subscription lists. With careful husbanding of the increased income resulting, and by careful administration of its resources, he asserted with confidence, "it will shortly be placed upon a stronger and better footing, and be able to meet its current obligations, including interest on bonds."

There are virtually $3,000,000 in bonds at 5 per cent., maturing in 1935, outstanding against the company.

Richard W. Montague, appearing in court for the company, promptly filed an answer to Mr. Hill's complaint, in which he admitted all the allegations, and joined in the prayer for a receiver. Judge Wolverton then appointed Mr. West.

"The receivership will make no difference in the company's service," said J. C. Potter, auditor of the Home company, in speaking of the court's action. "In fact, if it had not been published, the general public would not know there was a receiver, for service will go on just as it has been doing, and will not be interfered with in the least.

"The Home company has obtained 3,000 new subscribers since January 1, and we expect to continue the good work. Competition under the receiver will be keener and more aggressive than before. The receivership will strengthen the financial condition of the company, and enable a reorganization to be carried out that will place it on a thoroughly sound financial basis."

For some time it has been an accepted fact that the reorganization of the Home company would have to come sooner or later, and the action resulting in the appointment of the receiver is the first step toward this end. The next step is expected to be the formation of a pool of bondholders, of whom Mr. Hill is one, to decide what they should realize on the company, and then sell it for that figure.

Under such a reorganization the bondholders will be protected to the full value of the company's plant, although not to the full value of their bonds.

The Home Telephone & Telegraph Co. was organized by Portland capitalists in 1905. The present physical valuation of its plant, which is declared to be in exceptionally fine condition, is estimated to be about $2,500,000. Capital stock of the company aggregates about $2,700,000. Including 3,000 new subscribers obtained since January 1, the company has about 11,000 telephones installed in the city.

The Collection of Toll Charges by Originating Company.

In ordering the Osceola Telephone Co., on June 23, to maintain toll connections with the Dakota Central Telephone Co., at Iroquois, the South Dakota Railroad Commission held that a provision requiring as a condition precedent to receiving toll service that the connecting company shall be compelled to guarantee, collect and pay over to the toll company the fee for the transmission of the toll message is reasonable.

This ruling was made as a result of an investigation into the practices and contracts of the Dakota Central and Osceola telephone companies relative to the collection of toll charges, and the switching of rural telephones at Iroquois, upon complaint of the Dakota Central company.

On June 1, 1915, a switching contract was executed between the companies for the switching of rural lines of the Osceola company at the Dakota Central exchange in Iroquois, which contained a provision for its termination at the expiration of 30 days after the service of notice to that effect. On January 12, 1917, and again on January 25, 1917, such notice was given the Dakota Central by the Osceola company, whereupon the former made complaint to the commission.

At the hearing in the case it developed that the Osceola company objected to a provision in the switching contract that the Osceleola company shall make payment to the Dakota Central company on or before the fifth of each month for all toll service rendered during the preceding month.

This provision, the commission held, is not unreasonable. In all cases coming before it, on applications of rural party lines for connection with toll lines, the commission has required that the telephone company making application for the connection shall guarantee and each month pay over to the toll line company, on or before a specified date, the amounts accrued for the transmission of long distance or toll messages.

The reason given by the commission for this rule is that telephone companies making application for long distance or toll service must, as a condition precedent to the receipt of this service, assure the toll line company that the fees fixed for the transmission of toll messages will be forthcoming at the end of the month.

It would create an intolerable situation if a toll line company, connected with numerous exchanges and rural party telephone lines throughout the state, were compelled not only to receive and send toll messages but were put to the additional burden of collecting the fee from each individual sender.

The expense of such collection would be so great as to render the business under reasonable rates unprofitable, and if that system were in vogue the expense of the collection would necessarily have to be included within the rate. Such a system, the commission states, is altogether illogical and unworkable.

After a careful consideration of the evidence in the case, the commission ordered:

That the Osceola Telephone Co. maintain its toll connection with the Dakota Central Telephone Co., on the basis in effect under its contract dated June 1, 1915;

That all toll messages originating at subscriber's station on its lines be guaranteed, collected and paid over monthly to the toll line company;

That in all cases where messages from non-subscribers originate at subscribers' stations on its lines, the toll rate shall be collected by the Osceola company from the subscriber at whose station such toll messages originated. Order 2780.

Revision of Telephone Toll Rates in Pennsylvania.

Some months ago there was undertaken a general revision of the toll service rates of the Bell Telephone Co. of Pennsylvania and associated companies. There

was first adopted a new schedule of charges on messages between Pennsylvania and New Jersey. By this schedule the previous rates, containing numerous inequalities, were so revised as to establish like charges for like distances, and the new rates were uniformly determined on an air-line rather than a circuit-mileage basis.

This has likewise been the basis of a further revision which is announced in a notice that will be sent to Bell subscribers in Pennsylvania with their July 1 bills. This further revision, effective June 21, embraces the schedule of telephone toll charges on messages between Pennsylvania points, between Delaware points, and also on messages between the two states. The rates have, in general, been reduced, while in some cases there have been slight increases and certain of the rates have been continued without change.

Based on existing traffic volumes and making no allowance for increased service usage by reason of rate reductions, a saving of approximately a quarter of a million dollars a year in toll service payments will result.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

June 19: Application filed by Frank Pellissier and E. S. Moore, for a certificate of convenience and necessity to operate a telephone system in Mono county.

June 19: The commission ordered the San Diego (Cal.) Home Telephone Co. to charge its established rates to all persons without discrimination, and to enforce its rules in all cases. Charles E. Sumner, and John A. May, attorneys of San Diego, complained to the commission that the telephone company has been waiving the installation deposit of $3.50 provided in its rules and regulations on file with the commission, and has been giving free service to many patrons.

IDAHO.

June 19: Application filed by the Camas Prairie Telephone Co., of Fairfield, for permission to increase rates.

INDIANA.

July 5: Hearing in Columbus on petition of the Citizens Telephone Co., of Columbus, asking authority to establish a toll rate between its exchanges at Columbus, Clifford, Elizabethtown and Grammer, with connecting trunk lines between them, and a connecting trunk line between Columbus and Jonesville, and also to establish a toll rate between its exchange and the exchanges of Hope, Hartsville, Taylorsville, Azalia, Waymansville and Ogilville; that a rate of 10 cents per message of five minutes or any fraction thereof, and an overtime charge of 5 cents for each 2½ minutes or fraction thereof, be established between all the aforesaid stations.

MINNESOTA.

June 27: Petition of J. M. Kohner for an investigation of the affairs of the Mount Vernon Farmers Telephone Co., of which he is a stockholder, dismissed, the commission being of the opinion that that is a question which must be presented by the company.

MISSOURI.

June 26: Peoples' Telephone Co., of Graham, filed a petition asking to be allowed to increase its capital stock from $6,500 to $12,000.

June 30: Commission authorized the Cass County Telephone Co., of Harrisonville, to purchase the property of the Pleasant Hill Telephone Co., at Pleasant Hill, at an agreed price of $13,250, and to issue bonds in the amount of $15,000.

The Cass County Telephone Co. recently purchased the plant of the Bell company at Pleasant Hill, and intends to consolidate the two plants, making improvements and betterments in the plant at Pleasant Hill.

NEBRASKA.

June 22: Application of Wyoming & Nebraska Telephone Co., for permission to cancel discount of 25 cents a month for prepayment of rentals; it appearing to the commission from an examination of the books of the company that it is not earning any returns on its investment, application was granted.

June 22: Application of Hamilton County Farmers Telephone Co., for permission to issue $1,000 worth of stock for building of extensions and construction work; granted under condition that it be sold for cash and at par.

June 24: Application of Farmers' Telephone Co., of Dodge, for validation of rate of $1.75 for farm service and 25 cents for extension telephones; granted.

June 25: Ordered that hearing upon the application of the Pierce Telephone Co., for permission to increase exchange rates and switching charges be set for July 6, and all interested parties notified.

June 25: Complaint of E. A. Rogers that the Rock Island Railway Co. does not maintain telephone service in depot at Prairie Home; dismissed by commission because such service cannot be required, under the law, where there is no exchange in the town.

June 25: Complaint of Frank Crane, of Hubbell, that Frontier Telephone Co. is guilty of discrimination and gives poor service, bottomed on charge that company refuses to continue practice of allowing service to be paid for at end of year with some patrons and not with others.

June 26: Application of Linwood Telephone Co., for permission to sell $500 worth of treasury stock for building extensions; granted.

June 26: Application of Walnut Grove Telephone Co. for permission to increase rates from 75 cents to $1 a month. Company serves rural communities of Walnut and Venus, and commission ordered a statement of receipts and expenditures.

June 27: Application of Nebraska Telephone Co. to cancel four-party rates on St. Edwards' exchange; it appearing that no subscriber now takes it, and company does not desire to give service, application granted.

June 27: Complaint of R. A. Bouton that Farmers' Telephone Co., of Shelton, discriminates against him in matter of service, dismissed for want of merit.

June 27: In re dispute between Nebraska Telephone Co. and residents of Loup river valley, it was held that the company cannot be required to furnish extraordinary service desired unless by contract of not less than five years or contribution to excess cost of construction, it is guaranteed proper return on necessary investment.

June 27: Complaint of Farmers' Elevator Co., of Rohrs, that it cannot secure individual line service from Auburn Telephone Co.; ordered that if elevator company will enter into five-year contract the service shall be furnished.

June 27: Informal request of Glenwood Telephone Co. to return to mutual form of organization; denied by commission on ground that having entered into contractual relations with various persons to whom it sells service and offering toll facilities to the general public, mutual cannot take place of stock company.

NEW JERSEY.

June: Hearing on application of former Assemblyman James T. Ackerman, of Bergen, for an order compelling the public service corporation to remove its electric light poles from Paramus Road and Ridgewood avenue, just east of Ridgewood, where Mr. Ackerman lives. The claim is that the wires are a menace to life and limb and that they should be placed underground.

What gave life to this movement was the death, a short time ago, of a boy, Aaron Davis, who was electrocuted by a live wire which fell from one of these poles. Since then the interest in the movement has increased because of the injuring of James Sullivan, aged 15, by a live wire from an electric pole at Essex Falls, west of Newark. The question as to whether the electric light company should be allowed to run highly-charged wires overhead in thickly-settled places is one of the problems which will come up for consideration.

OKLAHOMA.

June 18: Hearing on the application of citizens of Achille, Okla., for a certificate of public convenience, enabling them to install a telephone exchange in the field already occupied by the Pioneer Telephone & Telegraph Co. This is the first application under the new law, which places such questions in charge of the commission.

PENNSYLVANIA.

June 20: Proposed lease of space in the Keystone Telephone Co.'s conduits by the Philadelphia Electric Co. approved by the commission in informal ruling.

June 20: Question of when a rural telephone line shall be considered to have all the subscribers it can accommodate was argued before the public service commission, in complaints of residents of Perry county against the Buck Valley Rural Telephone Co. No. 2. The company contended it had 18 and 20 people on some lines, and could not care for more.

SOUTH DAKOTA.

June 23: In the case of R. E. Rich, of Bath, S. D., vs. the Dakota Central Telephone Co., the commission ordered the company to continue its practice of furnishing party-line service to its subscribers in Bath at the rate of $1 a month for local service furnished, and interchange of messages with the rural subscribers of the company on lines located in territory tributary to Bath. The company is also ordered to establish and collect a toll charge of 10 cents in place of its present charge of 15 cents for messages between its subscriber stations in Bath and its exchange in Aberdeen. Order 2753.

June 23: The commission ordered the Osceola Telephone Co. to maintain toll connection with the Dakota Central Telephone Co. on the basis in effect under its contract dated June 1, 1915, and to guarantee, collect and pay over monthly to the toll line company the revenues for all toll messages originating at its subscribers' stations. Order 2780.

Examination for Junior Telegraph and Telephone Engineer.

The United States Civil Service Commission announces an open competitive examination for junior telegraph and telephone engineer on July 25. Vacancies in the Interstate Commerce Commission under the act providing for the valuation of the property of common carriers will be filled from this examination.

The following positions established under the above act will be filled from the register resulting from this examination:

Junior telegraph and telephone engineer, grade I, $1,200 to $1,680 a year.

Junior telegraph and telephone engineer, Grade II, $720 to $1,080 a year.

Applicants should apply at once for Form 2039, stating the title of the examination for which the form is required, to the United States Civil Service Commission at Washington, D. C., or any of the branch offices.

Meeting of Western Pennsylvania Association in July.

The next regular quarterly meeting of the Western Pennsylvania Independent Telephone Association will be held at Johnstown, Pa., July 27 and 28,the first session to convene at 2 p. m., July 27, in G. A. R. hall, on the west side of City Park. After the regular business session Saturday morning, an outing will be held at "Shady Glenn," E. D. Schade's summer home in the hills outside of Johnstown.

A letter from Mr. Schade, who is chairman of the executive committee, gives a vivid picture of what is going to happen Saturday afternoon.

"The ex-e-cu-tive committee has made the following arrangements:

Unanimous outing Saturday at Shady Glenn.

With the railroads—No trains will leave Johnstown on Saturday.

With Tommy Thompson—To bring his famous Calithumpian band.

With Harry Young—To furnish a boiler shop quartette.

With Denny Shaler—To give an exhibition of great skill and dexterity in serving 'high ones' with both hands.

With Jack Coffey and J. B. Edwards—To settle that old 'shirtless quoit' dispute.

With Pop Wilson—To challenge, and take on the winner of each event (not including poker).

Tommy Careless will be chief marshal of transportation.

Doc. Griffith will be master of ceremonies.

Bert Murdock will again be leader of the band.

Red Cross hospital on the grounds where first aid will be administered.

On account of the H. C. of L. everyone is requested to tote his own supply of liquids."

Telephone System in Cuzco, Peru, South America.

The Empresa Telefónica de Cuzco, Peru, South America, is now giving service to about 100 subscribers, all of whom are located in the city of Cuzco. This service is available only from 6 in the morning to 9 at night, and is not sufficient for the needs of the city. The apparatus now installed consists of two small switchboards, having a capacity of a few more than a hundred subscribers and magneto type instruments with local batteries. All the apparatus was made in Sweden.

The Compañía Electrica is about to purchase this system and will remodel it throughout. In fact, it is its intention to make a complete new installation with new equipment and larger switchboard.

Report of the Riverside (Cal.) Home Company.

The Riverside (Cal.) Home Telephone & Telegraph Co. reports for the year ended December 31, 1916, operating revenues of $17,169; operating expenses, $15,132; net operating revenue, $2,037; non-operating revenue, $1,362, making a gross corporate income of $3,400. After making deductions for interest, rent and taxes, there was a net corporate loss of $11,897.

The Roll of Honor

Since the publication in TELEPHONY of the list of telephone men who have volunteered for service in the United States Signal Corps, the following names have been received by W. S. Vivian, secretary-treasurer of the United States Independent Telephone Association from the group chairmen of the central war department:

Western Group, Frank H. Woods, chairman, Nebraska, Iowa.
Chas. G. Riedel, Lincoln, Neb.
T. R. DeWolf, Weeping Water, Neb.
Frank Frederick Spier, Lincoln, Neb.
John M. Hobson, Weeping Water, Neb.
Shirl Benona Keck, Lincoln, Neb.
George Mehuron, David City, Neb.
Central Group, Hart F. Farwell, chairman, Indiana, Illinois, Kentucky.
Leon M. Harmon, Astoria, Ill.
Ralph Connor, Monticello, Ind.
Northwestern Group, G. W. Robinson, chairman, Minnesota, Wisconsin, North Dakota, South Dakota.
A. W. Anderson, Minneapolis, Minn.
C. A. Thomas, St. Paul, Minn.
R. V. MacDonald, Minneapolis, Minn.
Vern W. Pratt, Minneapolis, Minn.
Charles D. Hubbard, St. Paul, Minn.
E. W. Chaffee, Amenia, N. D.
Charles L. Peters, Windom, Minn.
Eastern Group, Frank L. Beam, chairman, Ohio, West Virginia, Michigan.
Wm. Watt, Cleveland, Ohio.
Harold Darrow, Cleveland, Ohio.
Jos. E. Roach, Cleveland, Ohio.
Albert Steffan, Cleveland, Ohio.
Arnold Rosenjack, Cleveland, Ohio.
Asher Webster, Cleveland, Ohio.
Boyd E. Harshburger, Cleveland, Ohio.
Geo. Squires, Cleveland, Ohio.
John Baxa, Cleveland, Ohio.
Edw. V. Fox, Cleveland, Ohio.
Harry Nichols, Cleveland, Ohio.
Geo. A. Windan, Cleveland, Ohio.
Stanley Shepard, Cleveland, Ohio.
Fr. E. Long, Cleveland, Ohio.
Jos. W. Lounebury, Cleveland, Ohio.
Gardner Shipley, Cleveland, Ohio.
David Swan, Jr., Cleveland, Ohio.
Wm. Archibold, Cleveland, Ohio.
Merritt Bell, Cleveland, Ohio.
Sherman Newman, Cleveland, Ohio.
Geo. Henning, Cleveland, Ohio.
Leo Snyder, Galion, Ohio.
Walter Smith, Galion, Ohio.
K. L. Miller, New Philadelphia, Ohio.
Chas. Arnold, New Philadelphia, Ohio.
Ray E. Neill, Cleveland, Ohio.
Robert H. Frese, Akron, Ohio.
Horace J. Paddington, Akron, Ohio.
Thomas Savalan, Akron, Ohio.
Ernest K. Sale, Rack, W. Va.
Elmer J. Row, Ashtabula, Ohio.
Roland Pierstorff, Spencerville, Ohio.
Von C. Swoveland, Ohio City, Ohio.
Wm. R. Redman, Cleveland, Ohio.
Eustace Green, Lakewood, Ohio.
Wm. A. Collins, Cleveland, Ohio.
Elmer Heidelman, Cleveland, Ohio.
Czar Comstock, Cleveland, Ohio.
Harry Coyle, Cleveland, Ohio.
W. J. Savens, Cleveland, Ohio.
Ed. C. Ellam, Cleveland, Ohio.
Robert Ellam, Columbus, Ohio.
Fred Koberna, Cleveland, Ohio.
Pleaman Sharp, Cleveland, Ohio.
Victor Brossoit, Cleveland, Ohio.
Chas. Farrell, Cleveland, Ohio.
Plymon Tuttle, Cleveland, Ohio.
Lloyd Clapp, Cleveland, Ohio.
Albert Koberna, Cleveland, Ohio.
Clarence Woodburn, Cleveland, Ohio.
Willard Clarke, Lakewood, Ohio.
Russell Collins, Columbus, Ohio.
Wm. Thompson, Lebanon, Ohio.
John Henry, Corning, Ohio.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

704. Why is it sometimes advisable to switch toll circuits from the toll switchboard to the local switchboard. Explain how it is done.

705. Why are the toll switching keys so made that they may be mounted in close proximity to the line jacks to which they belong?

706. What type of keys is used for toll line switching?

707. Why is it difficult to make a satisfactory classification of multiple toll switchboard equipment? What is the most practicable basis for a classification?

708. Is there any difference between the drop-signal of toll line multiple switchboard equipment and that employed in magneto local service? What two general types of busy test indications are used on multiple toll switchboards?

709. State two reasons why it is more essential to carefully guard a busy toll line from intrusion of other calls than a local line. Why is thorough guarding of busy toll circuits somewhat simpler in lamp-signal than in drop-signal toll line equipments?

710. Into what two divisions or classes are toll operators divided? What equipment is provided for recording operators?

711. What record does the recording toll operator make when a call is placed? What provision must be made on the keyboard of the toll switchboard?

712. Outline the work of the line position toll operator. What portion of her duty requires an excellent knowledge of circuits, routes, transmission conditions and of other telephone offices?

CHAPTER XXVI. The Multiple Toll Switchboard (Continued).

713. *The drop line signal toll line circuit.*—By far the most commonly found line signal in modern multiple toll switchboards is the ordinary drop having an enclosed magnetic circuit. Such a line signal is particularly well adapted for use on toll lines that are bridged into the office and which receive through calls from two other directions. This is because the construction of the modern enclosed drop gives it a very high inductance reactance. Such a drop may, therefore, be bridged across the toll circuit at an intermediate office without involving serious additional transmission loss.

Important long-haul telephone circuits are not ordinarily tapped in this way at intermediate offices. The line signals, on such circuits, are always disconnected

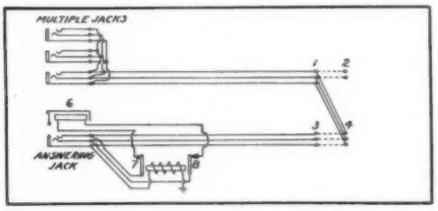


Fig. 218. Manual Drop Cut-Off Relay Toll Line Circuit.

when the line is in use for long distance conversation and such transmission losses as might result from their presence on the circuit is prevented.

714. *A standard wiring arrangement.*—One of the standard wiring arrangements for toll line switchboard equipment is shown in Fig. 218. In this drawing the main distributing frame terminals of the tall *line* are represented at points, 2, and the intermediate distributing frame terminals associated with the toll line circuits at points 3 and 4. The toll line circuit enters the central office equipment through a pair of main distributing frame terminals, 2.

From the main distributing frame terminals, 2, which are usually a heat coil and lightning arrester looped into each side of the circuit, the toll line is carried by flameproof jumper wires to the terminals, 1, of the multiple jack cables on the opposite side of the frame. The terminals of the multiple jack cables as well as the cables from the terminals of the multiple jack side of the intermediate distributing frame, are connected to the same soldering clips on the main distributing frame. In other words, the circuit wires from the multiple jacks to the multiple side, 1, of the main distributing frame and to the multiple side, 4, of the intermediate distributing frame, are in switchboard cables and are permanent.

The jumper wires on the main distributing frame joining 1 and 2 and those on the intermediate distributing frame joining 3 and 4 are less permanent in character. That is to say, they can be easily shifted from the terminals of one circuit to those of another.

By means of the jumper wires joining 1 and 2, the toll line circuit may be connected with any set of multiple jacks. In the same way, by means of the jumper wires joining 3 with 4, the toll line circuit which has been connected with its proper multiple jack at 1 and 2 may be assigned any desired answering jack.

All multiple *jack* terminals appear on the multiple side of the main and intermediate distributing frames at 1 and 4. All the terminals of the answering jack cables appear at the answering jack side of the intermediate distributing frame. This arrangement is precisely like the distributing frame arrangement employed in the distribution of local switchboard circuits and is intended to serve the same purpose.

It is necessary for the reason that the traffic load on any given group of toll line circuits sometimes becomes so heavy, just as the traffic in local groups sometimes becomes heavy, that one or more of the individual circuits of the group must be taken from the busy group and transferred to another group terminating on a less busy position. In such cases it is unnecessary to transfer the toll circuit to another set of multiple jacks.

The principles underlying the main and intermediate distributing frames may be reviewed by reading sections 330 to 338, inclusive, TELEPHONY'S Home Study Course for Telephone Men, March 4-11, 1916.

715. *Answering calls at distant positions.*—It is obvious that an occasional toll call may be answered by a distant operator in the multiple jack of the calling line as it appears on her position. With the type of drop signal shown in Fig. 218, such a proceeding is perfectly allowable but it will be necessary for the supervisor, or another operator near the answering jack, to manually restore the drop shutter at once.

Should there be a failure to restore the drop shutter at the answering position at once, there would be the possibility of confusion due to the operator at the answering position intruding on the circuit in answer to the non-restored signal after the call had been answered. This is a disadvantage that is found in all multiple

switchboards, local as well as toll, equipped with drop line signals. In times of normal traffic, when an operator occupies each of the answering positions, such a condition is rare. During times of light traffic it may cause occasional annoyance.

716. *The toll line audible busy test.*—The insertion of a plug belonging to a cord pair, into either the answering jack or one of the multiple jacks of the toll line circuit, Fig. 218, will permit a flow of current to take place over the sleeve or test of the plug, the sleeve or test of the jack, the jumper wire, the switchboard cable conductor, and the winding of the cut-off relay to the grounded terminal of the common battery.

Such current flow not only energizes the cut-off relay, but also raises the potential of the test or sleeve contact of all the multiple and answering jacks associated with the same line circuits. This rise in potential of the jack test or sleeve contact prevents the intrusion of another connection on the line by giving to any operator testing the jack an audible busy test. The general subject of the audible busy test for both toll and local equipment may be reviewed by reading again sections 372-375, inclusive, TELEPHONY'S Home Study Course for Telephone Men, April 15-29, 1916.

The cord circuits that must be used with line circuits of this type must, obviously, be provided with connections to the non-grounded terminal of the common battery on their third or sleeve contact so that the audible busy test on the jacks of engaged lines will be assured and also that the cut-off relay will be energized, disconnecting the line drop, 6, from the busy toll line circuit.

717. *The lamp signal toll line circuit with ring-up lock-up line relay.*—In the circuit shown in Fig. 218 the line signal is *operated,* as a matter of fact, by gravity. The shutter is *released* by the movement of the latch in response to the flow of ringing current through the drop winding.

Since the ringing current from the distant office is merely required to *release* the shutter which is operated by gravity, this type of signal is very reliable and satisfactory when used on toll lines. In the case of a call being received over a long or heavily-loaded toll circuit, or over one that is "heavy" in operation for any reason, the shutter is almost sure to be released by some one of the current impulses received if not by the very first.

In Fig. 219 is shown a type of toll line signal circuit in which the receipt of the incoming call is announced to the operator by the lighting of a miniature switchboard lamp. This type of toll line signal is displayed before the operator and is associated with its answering jack in exactly the same way as the signal is displayed in association with its answering jack in the common battery lamp signal local switchboard equipment.

The energizing circuit of the lamp line signal, Fig. 219, is completed when the armature of the line relay, 9, is attracted and closes the normally-open circuit at the contact points, 12. When the spring contact at 12 is closed by the movement of the armature, a path for the energizing of the relay of the consequent retention of the armature in the attracted position, is created. At the same time a path for the flow of energizing current through the line lamp signal, 6, is completed through the same contact springs.

The primary energization of the relay, 9, is due to the flow of the alternating current from the distant office through the winding, 10, in series with the normally-closed relay contact, 7. Once energized by the ringing current, the relay armature is retained in the attracted position after the flow of ringing current over the line is interrupted.

The receipt of the call causes the lamp signal, 6, to become bright and it remains bright until the call is answered by the insertion of a plug into one of the multiple jacks or into the answering jack at the line position.

718. *The relay locking circuit.*—When the armature of the relay is in the attracted position with the normally-open contact at 12 closed, the circuit through which the energizing current for the line lamp, 6, flows may be traced as follows: From the grounded terminal of the common battery through the normally-closed contact, 8, the normally open contact, 12 (now closed), the armature spring of the relay, the conductor in the switchboard cable leading to the lamp, 6, to the non-grounded terminal of the common battery.

When the operator answers the displayed signal, the insertion of the plug completes a path for the flow of current through the third or sleeve contact of the plug, the third or sleeve contact of the jack, the conductor of the switchboard cable, the winding of the cut-off

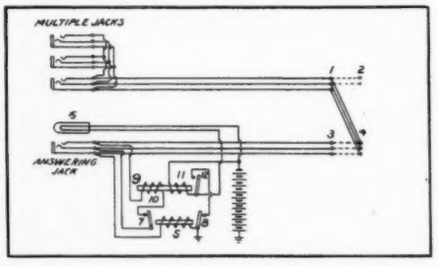


Fig. 219. Ring-Up Line Relay and Lamp Toll Line Circuit.

relay, 5, to the grounded terminal of the common battery.

As the result of such a flow of current, the relay, 5, is operated, and the circuit from the lamp, 6, and the locking winding. 11, of the line relay, 9, to the grounded terminal of the common battery is broken at the normally-closed relay contact, 8, At the same time, the circuit through the main winding of the relay, 9, is broken at the normally-closed relay contact, 7, disconnecting the main relay winding, 10, from the engaged toll line circuit. The lamp, 6, is also darkened and the armature of relay, 9, is released by the breaking of the connection to the grounded terminal of the common battery at the contact point, 8.

719. *Advantages of circuit using lamp line signal.*—The circuit arrangement shown in Fig. 219, and all others using lamp signals, have several advantages over the circuit using the ordinary drop as the line signal. The space that must be alloted to the toll line signals when lamps are used is much less than the space that must be allotted to the signals when drops are used.

In switchboards of large line capacity this is a consideration of prime importance. The toll switchboard may not be built high; its apparatus space is therefore to be devoted as little as possible to signal space. In addition to the economy in space required, there is another very important advantage inherent in all forms of lamp signal for toll or local lines. This lies in the possibility of any operator answering any call from the multiple and of restoring the line signal to normal when so doing.

In times of abnormal traffic conditions it is often possible for the operator at a distant position to answer and handle the call received over a circuit whose answering jack is located at a distant position. When a call, received over a toll line circuit like that shown in Fig. 219, is answered from any jack, the signal is restored to normal.

This eliminates the possible confusion due to an attempt to answer on the part of the line operator at the position where the answering jack is located. With the manually-restored signal, on the other hand, the signal at the answering jack position continues to be displayed until manually-restored, although the call has often been given attention at another position by an operator plugging into the multiple.

720. *Disadvantage in the lock-up ring-up line relay.*—The lock-up ring-up relay is open to the disadvantage pointed out in section 703, TELEPHONY'S Home Study Course for Telephone Men, June 23, 1917. The electrical operation of the ring-up, lock-up type of relay is such as to make certain its occasional failure to operate satisfactorily. This is due, as has been pointed out, to the possible neutralization of the magnetic field created by the line current, by the opposing magnetic field created in the relay core by the current flowing in the locking winding.

(To be continued)

Practical Subjects—Discussions

Sunshine and Shadows Along the Telephone Trail.

By Well Clay.

A "shooter" on his cheerful way
Went fixing troubles from day to day;
Making no bids for the Hall of Fame,
Nor tooting his horn in loud acclaim;
'Til his duties had covered a score of years
And the hair was grizzled about his ears.

Known to all was he for miles around,
As time fled by this thing he found,
As he visited each home on his daily rounds,
Looking for "shorts" and "weaks" and "grounds";
He saw not only the folks he came to see
But, in his memory, the patrons who used to be.

He greeted, in some home, the new-wed bride
While remembering the mother who used to abide
In that self-same home, when his job was new—
How she used to welcome and scold him, too,
Because the line was out of repair—
And soberly he glanced at her empty chair.

The self-same things which the bride had said,
He'd heard from the mother before, now dead;
The father, the mother, the daughter, the son;
He'd known them all since his job begun;
He knew the old folks—long laid to rest—
As well as the younger ones out in the West.

He knew their relations and friends, and more—
He knew of old gossip and scandals galore;
He had witnessed the sorrows and joys which pass
O'er the life of a home like a breath on the glass
Of the mirror of time—yet nothing said he
To the bride, of the people who used to be.

Ofttimes where he called, finding no one at home,
He "worked his way in" and was never alone,
For his patrons of yore were there as of old
To praise or to blame, to gossip or scold.
The flesh and blood patrons a new man can see
But he knows naught of the patrons who used to be.

I suppose Methuselah would have been in a crowd most of the time if he had been a lineman, and had stayed on the same job all the while, but an ordinary trouble shooter with a few years' experience in the same locality will accumulate quite a bunch of recollections, and see many changes in the personnel of his patrons.

This is true as to the publishing game. I have no doubt that the honorable publishers of this indulgent magazine have a mighty kindly recollection of many a good friend in the telephone game of past years who is with us no longer. They, too, are accumulating a bunch of memories, and when they attend conventions they see scores of people about them whom the delegate attending his first convention sees not at all.

The operator at the board recalls to mind the sound of old voices which come no more over the line; some she misses with regret and some afford her relief to think that no more will she have to take a volley of censure every time something gets wrong with the line or the party does not answer.

I have heard of some linemen who got to remember old cases of trouble in the same way, from the fact that they had occurred so often in the same place. They had become familiar with them because they had never taken quite time enough to fix them completely, and consequently had to go after them repeatedly. They became so proficient from long practice in locating the exact spot that they never hesitated or paused to do any testing, but went after it, vowing mentally to come along there soon with all the essentials and fix it for keeps.

Such a man should, of course, be added to the recollections of the telephone company that employs him, and generally is sooner or later. He is always going to do it next time, but time slips away and he never does seem to get started.

In the memory line, in the telephone business, are also a goodly number of phantoms in the operating line, and many a rule which used to be accepted as genuine good practice we have seen go by the board as its fallacy became apparent.

The good old friends which we used to know, in makes of instruments, have also suffered the fate of some of the humans and find themselves laid away in the junk pile until the junk man shall blow his horn. What a massive old structure the old-time bridging telephone looks now alongside the trim and compact styles which the manufacturers send us, when our credit is good. The comparison between them is not more wide perhaps than that between the first cars and the stream line streaks, which pass our doors today, but it is as great.

People may come and people may go, but types are always the same, today, tomorrow and forever, and the troubleman finds that he does not have to get personally acquainted with every new patron that fills the vacancy by a departed. He merely has to classify the new one and he feels acquainted right away because he has known the new patron in the guise of an old one for a while back. He will know his likes and dislikes, and will hear from him about the same criticisms which he has heard from the old friend. He will know his habits pretty closely, and what to expect.

He will recognize the type as soon as he begins to talk about the telephone. When he says that he "hardly ever uses the telephone himself," we will know that he uses it a lot. When he says "his folks never take down the receiver except when their ring comes over the line," we know at once that the left-hand corner of the shelf on his telephone will be worn shiny from the leaning elbows on it habitually while some one takes in the passing voices. They catalog themselves and fall into their proper place at once, automatically.

How we would miss such old friends as these. We would be lost, and find that we had drifted from our bearings into strange waters if we should hear the old familiar chestnuts no more. But there is little liklihood that the supply will give out any more than the list of patrons is likely to decrease. Chestnuts never die, and the parent tree is ever green.

The patrons of today are the ones with whom we have to deal, and the ones from whom we collect the money for telephone service. The fact that a troubleman fixed his grandfather's telephone cuts little ice with a modern patron unless his own is kept in apple-pie order.

The old friends are of as little use to us, from a business standpoint today, as would be the dollars which they paid us of old, in case we tried to utilize their phantom shapes again. The dollars are gone with the ones that paid them even up for months of telephone service, and it is only as we are able to deal with the present efficiently that we continue to make good as telephone men.

APHORISM: The fabric of dreams makes poor clothes for every-day wear.

Excavating with Power Trencher for Laying Conduit.

Some interesting facts relative to excavating with a power trencher for laying underground conduit are told by C. T. Mortimer, chief clerk of the construction department, Long Island division, of the New York Telephone Co., in The Telephone Review.

On this particular job the trencher excavated a trench 20 ins. wide and 56 ins. deep within the city limits at a maximum rate of 1,000 ft. per day, and a trench 36 ins. deep outside the city limits at nearly 2,000 ft. per day, which helped to speed up the job considerably. Owing to the proximity of a gas main, the trencher could not be used to the extent at first

anticipated, nevertheless it was proved that where no subsurface structures exist, namely, gas or water mains, etc., to interfere with its use, the trencher is both economical and a solution of the labor problem where labor is scarce or unobtainable. One mile of ordinary trench would justify its use, including the cost of shipping a reasonable distance to and from the job, at a rental of $50 per day for the trencher and operator.

Vehicular traffic on the road along which the conduit was being laid being extremely heavy, and it being the tendency of drivers to speed up on country roads, extraordinary safety precautions were deemed necessary. A fence or safety guard was therefore built, not only to prevent accidents to the public, but also to save considerable labor and hazardous risks to the men by preventing the dirt from spreading over the entire roadway. The material, concrete mixers, etc., were all kept on the trench side of the road, minimizing crossing the road and thus reducing the liability of accidents to the workmen.

Baseball Team of Paducah (Ky.) Telephone Employes.

The best "ballists" included in the staff of the Paducah (Ky.) Home Telephone & Telegraph Co. have perfected organization of a baseball team representing the plant. The team has been playing some very high-class ball and is reported to be in line for the amateur championship honors in the whole of western Kentucky.

In fact, the team has been playing such a high-grade article of baseball that Captain B. Y. Chambers, second baseman as well as district manager for the Central Home Telephone & Telegraph Co., has issued a challenge to all of the amateur teams of western Kentucky.

The schedule for the season is getting pretty well filled and the Saturday afternoons and holidays are few when no contest is booked.

All of the members of the team are connected with the Paducah plant. In the photograph reproduced on this page, reading from left to right, beginning at the top, they are: A. S. Cochran, second base and pitcher, superintendent of plant; W. D. Lowder, utility man, superintendent of equipment; Charles Swenter, utility man, storekeeper; K. E. Spears, business manager, cashier; D. H. Maxey, third base, wire chief; B. Y. Chambers, second base, district manager; Charles McCarty, first base, lineman; James Randolf, right field, lineman; J. W. Hightower, left field, inspector; T. P. Sandifur, catcher, local manager; Hiram Babb, pitcher, lineman; W. A. Gilliam, shortstop, collector, and Richard Raybourn, center field, assistant cable man.

Kentucky Telephone Men Who Are "Some" Ball Players.

The Index for Volume 71 of TELEPHONY

The index for Volume 72 of TELEPHONY, which was completed with the issue of June 30, 1917, is now ready for distribution among those who keep complete files of TELEPHONY. In this index are listed all the important articles which have appeared between January 6 and June 30, 1917. It will be supplied free of charge to those making application.

Prevention of Fire Losses by Telephone Companies.

An open letter from an insurance company to a telephone company was published recently in the Lincoln Telephone News as follows:

"In the first place it should be borne in mind that one fire loss is at least two and possibly three losses to you, as follows:

1. The property actually destroyed.
2. The loss of rentals and tolls.
3. The difference between the present value and the cost of new equipment.

This latter is, of course, a cash loss, but not a booking loss, and is not likely to be serious.

The principal risks or hazards in a telephone exchange are as follows:

1. From electrical defects.
2. From employes.
3. From exposure.
4. From dirt.

The first you are familiar with, and are avoided by standard insulation. The second needs your constant attention—old cloths, old shoes, oily rags, bottles of gasoline, etc., should be absolutely eliminated from your exchange. The ubiquitous gas blow torch should be watched like your busiest competitor. If he isn't, he will pocket six months' profits some dark night.

Third—risks from exposure can best be guarded against by teaching your neighbor good housekeeping, and the best way to do this is by example. Wire glass windows, fire doors and parapets are also good, but a fire *not started* is by far the easiest and cheapest fire to put out. Which brings us to our last risk, from dirt. The antidote is cleanliness, good housekeeping, first, last and all the time. This simply means no dirt—a place for everything and everything in its place."

Another Example of Operator's Heroism in Recent Tornado.

Miss Alice Howles, operator for the Cumberland Telephone & Telegraph Co. at Bardwell, Ky., one of the western Kentucky towns visited by a recent tornado, stuck to her post in spite of the fact that the rear of the building was demolished and the roof torn off, leaving her seated at the board under the canopy of heaven. She kept right on answering calls and plugging in until the last line went down.

"Might just as well have been there as anywhere," she said to the newspaper man who asked her about her experiences. "I couldn't see any use in running and there were lots of calls, so I stayed until they came up after me. The only trouble is, in the storm I lost a sheet from my cash book and can't balance."

Association Benefits Members

Association and Exchange of Ideas and Experiences Necessary for Effective Results—Members Can and Should Make Use of United States Independent Telephone Association at Least Several Times Yearly—A Concrete Experience

By H. G. Addie

The time has gone by when anyone can say or feel that he doesn't need the help of others or that others don't need his help. Times have changed so rapidly, especially of late years, that the various doings or businesses of individuals, associations, etc., have become so closely correlated, or interjoined, that it would be sheer nonsense for anyone to now say that the Biblical statement "Man liveth not to himself alone," is untrue, for never in the history of the world has the statement shown its truth as strikingly as at the present time.

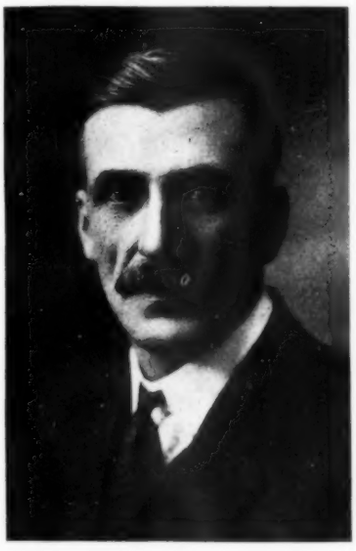
We occasionally hear of some "brainy" fellow making the statement: "I'll go it alone—I guess I'm smart enough to find out what I want to know. If I receive some hard knocks in doing so, I'll remember the experience all the better for I'll have paid the price for the knowledge."

Perhaps there was a time when such a statement might have had a little element of truth in it, but not now, for neither society, the trades, nor any of the professions, or other bread-winning ways of life have any room for the worker who is not willing to use or profit by the experience of others. Life is too short for the world to wait on the man who wants to re-discover for himself what he does not know, instead of availing himself of the experience of others. Employers nowadays want help who will take the shortest and best "cut" to the end to be attained. They will pay this class of help more money than they would otherwise, and by so doing will reap more profit for themselves.

Now to drop the foregoing generalities and get down to our own business of furnishing telephone service to the public. The public is the employer and the telephone company is the servant.

The public in its role of employer is quick to realize efficiency or the lack of it in its servant, the telephone company. Therefore, the fact certainly must be forced upon the attention of workers in the telephone field that in order for them to win the approval of their employer (the public) they must use every effort and avail themselves of every opportunity possible to render more and more perfect service. Inasmuch as association and exchange of ideas and experiences relative to the business are necessary to effective results, and as associations have been formed in practically all of the states of the Union, and a national organization—The United States Independent Telephone Association—has also been formed, it would seem as if every live, wide-awake telephone company would join at once its state organization and by all means the national association.

And now, Mr. Manager, let me here emphasize a word to you: When you secure your association membership don't do like many church and lodge members do. Don't think that you have done all that you should do—instead, do as you ought to do. Get all the good you can out of the association. If there



H. G. Addie.

is any problem bothering you in the way of your business, or you wonder if you are right as to your solution of how some work should be done, don't hesitate to write to Secretary Vivian and state freely what is bothering you. You'll be very much surprised at the painstaking care your inquiry will receive and you will certainly be pleased with the result.

Unless you are very much smarter than most people are, you will find that you can make use of the association several times each year. I might say here that we, although having been a member of the United States Independent Telephone Association for some time and having received service assistance several times, yet have to wonder how the association can do so much for such a small membership fee. Here is a sample of what is done for the "seeker after knowledge":

A short time ago the writer, having in charge something special in the way of a cable crossing to be made under railway tracks, submitted a sketch showing how we proposed to do the work, to Mr. Vivian and asked his opinion. His answer came immediately and stated that detailed information would follow shortly, which it did. We received information and specifications on how to do the work from three large companies and one well-known engineer—and it was just what we wanted. Now to furnish this information means that someone is "pretty much on the job."

Any of you are pleased when you receive a good bargain. This being the case, send today your $5 to W. S. Vivian, secretary-treasurer of the United States Independent Telephone Association, 19 South LaSalle St., Chicago, for membership, and then see if at the end of the year, you won't also say that you received the greatest returns for the money invested of any expenditure you ever made.

Annual Report of Fort Dodge Telephone Co., Fort Dodge, Iowa.

The Fort Dodge Telephone Co. reports for the year 1916 gross earnings of $64,976 and operating expenses, $63,368. Deducting for uncollectable accounts and taxes left a net income of $16,788. The balance sheet as of December 31, 1916, follows:

ASSETS.		
Plant	$301,545	
Depreciation reserve	42,759	
Net plant value		$258,786
Construction work in progress		4,245
Working assets		2,531
Unmatured interest		36
Prepayments		2,077
Total		$267,675
LIABILITIES.		
Capital stock		$208,200
Bonds		39,800
Working liabilities		10,405
Accrued interest and taxes (not due)		3,347
Surplus		5,923
Total		$267,675

Earnings of Rio Vista (Cal.) Company During 1916.

The Rio Vista (Cal.) Telephone & Telegraph Co. reports gross earnings of $5,972 for 1916. The operating expenses amounted to $2,748, leaving net operating revenues of $3,224. Adding the non-operating revenues and deducting interest charges left a net income of $3,262.

Financial Statements and Reports

Annual Report of Mutual Telephone Co., of Honolulu, Hawaii, Covering Operations During the Past Year—Financial Statement of Telephone Companies in Various Parts of this Country—Officers Selected for Ensuing Year

Financial Report of Mutual Telephone Co. of Honolulu.

The report of Manager F. G. Hummel of the Mutual Telephone Co., of Honolulu, Hawaii, for the year ended December 31, 1916—the sixth full year of operation of the automatic system in Honolulu—shows the company to be in an unusually prosperous condition.

During the year there were installed 945 instruments, which is 325 in excess of the previous year, and 165 more than have been added in any single year. The total number of telephones now in service is 6,965, which, together with 600 instruments owned and operated by the United States government, but available for connection with the Mutual company's system, makes a total of nearly 7,600 telephones.

On May 1, 1916, the new branch exchange at Kaimuki was opened and it is now serving about 700 subscribers. Orders have been placed for 600 additional switches in the Main automatic exchange, which, it is believed, will be ample to care for this year's growth.

The gross revenues for the year were $290,589, as compared with $246,528 in 1915. The operating expenses were $74,233, against $62,346 in the previous year, and the surplus, $92,187, as compared with $69,928.

The profit and loss account and also the balance sheet for the year 1916 are shown in the accompanying tables.

The officers of the company are as follows: President, E. F. Bishop; first vice-president, C. H. Atherton; second vice-president, J. R. Galt; treasurer, J. A. Balch; secretary, J. Waterhouse. The officers, together with R. A. Cooke and George Rodiek, constitute the board of directors. F. G. Hummel is manager of the company, and J. M. Pierce, assistant manager.

To operating expenses	$ 74,233	
To general expenses	49,975	
To reconstruction, depreciation and sinking funds	71,188	
To bond interest	13,509	
To miscellaneous	1,761	
To balance profit for year	92,187	
By service, etc.		$290,589
By interest and dividends		12,264
	$302,853	$302,853
By balance profit brought down		$ 92,187
By balance surplus 1915	$75,550	
Less premiums, etc., on investments prior to January 1, 1916, transferred to plant depreciation reserve..	1,293	74,257
To dividends paid	$ 61,557	
To balance surplus December 31, 1916	104,887	
	$166,444	$166,444

Profit and Loss Account of Mutual Telephone Co. of Honolulu, Hawaii.

ASSETS.		
Land and buildings	$ 74,113	
Switchboard and equipment	127,769	
Conduit, cable and overhead system, including instruments	484,521	
Country line plant	156,798	
Fire alarm system	1,635	
Time clock and stamp system	13,211	
Wireless plant and real estate	120,590	
Furniture and fixtures	4,800	
Horses and vehicles	1,826	
Tools and implements	3,379	
Material and supplies	12,249	
Sinking fund investments	157,853	
Investments in other companies	66,778	
Accounts receivable	13,127	
Unpaid rentals, etc.	$12,622	
Sundry accounts	505	
Suspense account	20,115	
Cash on hand and in bank	5,240	
LIABILITIES.		
Capital stock		$ 615,570
Bonds		315,000
Unpaid pay roll		4,325
Unclaimed wages		42
Accounts payable		12,646
Coin box and other deposits		3,387
Employers' liability insurance fund		4,234
Bond redemption reserve		14,050
Plant depreciation reserve		155,704
Bank overdraft		32,000
Surplus		104,886
	$1,263,994	$1,263,994

Balance Sheet of the Mutual Telephone Co. as of December 31, 1916.

Annual Report of the Roseville (Cal.) Telephone Co.

The Roseville Telephone Co., of Roseville, Cal., reports for the year ended December 31, 1916, gross operating revenues of $11,207; operating expenses of $7,708, leaving net operating revenues of $3,499. The net corporate income, after making deductions for taxes, rent, etc., was $2,721. Dividends to the amount of $1,434 were paid, and the balance credited to the surplus account, making a balance as of December 31, 1916, of $2,708.

San Fernando Valley Home Company Issues Annual Report.

The San Fernando Valley Home Telephone Co., which operates in Glendale, Burbank and Lankershim, Cal., reports for 1916 operating revenues of $21,393; operating expenses of $17,880, leaving a gross income of $3,513. Deductions for interest, rent, taxes, etc., left a corporate loss of $1,906. The surplus on December 31, 1916, was $16,136 as against $18,042 at the close of the previous year.

Financial Report of Ontario & Upland Telephone Co.

The Ontario & Upland Telephone Co., of Ontario, Cal., reports for the year ended December 31, 1916, operating revenues of $40,411; operating expenses, $41,099, leaving a gross corporate loss of $688. After making other deductions for rent, taxes, etc., there was a net corporate loss of $11,490.

"Is it better practise to paint cross-arms than it is to treat them with wood-preservative?"

THE above question is quoted from the "Question Box" of *Aera* for May, so also the following replies:

Answer from New York—"Painting wooden cross-arms is entirely a waste of labor and material, unless it is necessary on account of appearance. It does not increase the life of the arm to any extent, as paint does not keep water and decay out of the arm. I think that treating with wood-preservative is cheaper and probably helps to increase the life of the arm to a considerable extent."

Answer from Minnesota—"We have only one lot of creosoted arms. They are in better condition than painted arms that were put up at the same time."

Answer from Connecticut—"It is getting to be very generally felt that a preventive treatment is very much better than a paint treatment of cross-arms. With a well-dried arm and a good grade of paint very good results can be had; but it has been found with many companies that, in spite of all care, arms are often painted when green and the paint used is often of poor quality, so that any one of the several preservatives will better protect the green arm, and as a matter of fact is ess liable to adulteration than the paint."

Answer from California—"Yes, considering benefits derived from each process in this locality."

Answer from Ohio—"It is better practise to treat cross-arms with wood-preservative than it is to paint."

Answer from Texas—"For the sake of the preservation of the timber it is better practise to treat cross-arms with a wood-preservative, and also to treat the cross-arm gains with the same preservative than it is to paint them. The objection to treating cross-arms with any wood-preservative is that it renders the wood somewhat of an electric conductor, and it is therefore more conductive to grounds and shocks than when the cross-arms are merely painted."

Answer from Maine—"We believe treating with * * * [wood-preservative] is preferred to painting."

Answer from Colorado—"Wood-preservative is better than paint on cross-arms. However, linemen object to cross-arms treated with the former."

Out of eight answers only one is negative.

Treatment of cross-arms with coal-tar creosote oil is beneficial, inexpensive and simple. They should be permitted to season thoroughly, as it is not advisable to treat green arms.

After treatment cross-arms should be permitted to dry, and if that is done linemen will have no cause to "kick."

Carbosota Creosote Oil is the *standard* for non-pressure treatments. It is pure coal-tar creosote oil refined to meet the requirements of the Open-Tank and Brush methods. It is necessary that all wood to be treated by a non-pressure process shall be seasoned until air-dry.

Specify "Carbosota." This trade-mark is your protection.

Booklet regarding the CARBOSOTA *treatment free on request*

The Barrett Company

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria

THE PATERSON MANUFACTURING COMPANY, Limited

Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

Biographical and Personal Notes

Leonard D. Wildman, chief signal officer of the central war department, with headquarters at Chicago, has just been commissioned lieutenant-colonel, his former rank being major. Colonel Wildman entered the signal corps service in 1898, at the time of the Spanish-American war, as lieutenant. In the organization of the signal service reserve corps battalions, Colonel Wildman has met many of the Independent telephone men and they will be glad to learn of his promotion.

Chas. A. Bennett, general auditor for the Gary properties, with headquarters in Kansas City, Mo., has been associated with the telephone interests of Theodore Gary for the past 12 years, two years in operation and the balance of the time in accounting.

He has been active in accounting affairs of the national Independent telephone association since 1910 when the Interstate Commerce Commission first took up the matter of uniform accounts for telephone companies. He has also been active in accounting affairs of telephone companies and associations in Missouri, Kansas and Texas, the scope of present operations of the Gary interests.

Mr. Bennett is now and has been a member of the committee on telephone accounts and statistics and the accounting committee of the national association since the committees were created.

Prior to entering the telephone field, he was engaged in the operation of electric

Chas. A. Bennett.

light, power and water utilities for eight years.

Mr. Bennett is energetic, keen and of an analytic turn of mind, with the power to concentrate upon a problem until solved. He is a hard worker, conservative in his actions, but quick to see the real advantage of new ideas.

C. D. Longserre, manager of the Bardwell Telephone Co., Bardwell, Texas, and

C. D. Longserre.

a director of the Texas Independent Telephone Association, is a native of Pennsylvania, but has lived in Texas since 1873.

In 1899 he entered the telephone business as an employe of the Southwestern Telegraph & Telephone Co. as toll lineman at Hillsboro, Texas, and was later made manager for that company's exchange in the city of Waxahachie, Texas, in 1901, where he was located for the succeeding 12 years.

Deciding to cast his lot with the Independents, Mr. Longserre, in 1913, became interested in the telephone properties in and around Bardwell, Texas, where he is now located, and where he has been more than ordinarily successful.

Mr. Longserre is a valuable man to Independent telephony in Texas, being a hard worker in the state association, and in legislative matters. He has a large circle of friends in the business in the Lone Star state. His work in the state association since his election as a director of that organization, in February, 1917, has been conspicuous and very effective in many ways.

L. A. Herrick, manager of the Stephenson County Telephone System, of Freeport, Ill., since its organization, has retired indefinitely from active service and will take a much needed rest.

D. C. L. Mease, president of the Stephenson County Telephone System, of Freeport, Ill., has been appointed acting manager of the company.

George H. Crandall, of Springfield, Ill., has been appointed to the newly-created office of superintendent of the Stephenson County Telephone System, of Freeport, Ill.

J. W. Smith and **S. O. Steensland** have purchased the Beresford Telephone Exchange, at Beresford, N. D., with some 1,000 subscribers, from M. B. Ryan.

Frank Binkley, of Hamilton, Ohio, for seven years manager of the Hamilton Home Telephone Co., has been appointed manager of the United Telephone Co., at Bellefontaine, Ohio.

Stephen M. Isom, president and general manager of the Mitchell Telephone Co., of Mitchell, Ind., a native of the Hoosier state, was educated at the Southern Indiana Normal College at Mitchell.

He entered the telephone business with the Mitchell Telephone Co. when it was in its infancy, some ten years ago. Since that time, under Mr. Isom's guidance, the company has experienced a healthy and rapid growth. He is at present a stockholder and director of the company, as well as president and general manager.

Mr. Isom is one of the pillars of Independent telephony in Indiana. He is a director of the Indiana Independent Telephone Association and was instrumental in the organization of the Southern Independent Telephone Association, of which he is president.

Until about seven years ago Mr. Isom conducted a general store and did some farming. Since that time, however, he

Stephen M. Isom.

has devoted most of his time to his telephone business and association affairs.

Mr. Isom has always been very active in civic affairs and he is now president of the Mitchell Commercial Club.

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We want the opportunity to prove to you that we have the best supplies obtainable, and a special department to handle your orders and requests for information, efficiently and promptly.

PROMPT SHIPMENTS

Do you want a helpful book on line construction? We are sending, on request, to interested Independent telephone men a copy of Secrets of Service, a splendidly illustrated instruction bulletin on how, and how not, to build lines of all types.

This is written by a practical telephone man, and the many highly commendatory letters received from operating telephone men who have profited by reading this book assure its value to you.

Write today for a copy of our net price list and illustrated line supply catalogue.

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Columbus, Ohio, 409 Huntington Bank Bldg.

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

Herbert E. Waterhouse, well known in telephone accounting circles in the Central and Northwestern states, was married on June 21 to Miss L. P. Singletary, of Thomasville, Ga., auditor of the Consolidated Telephone & Telegraph Co., of that city.

Mr. Waterhouse, who was for several years with the Coffey System & Audit Co., of Indianapolis, and previous to that general auditor for the Dakota-Western Telephone Co., of Williston, N. D., and the Golden Valley Telephone Co., Beach, N. D., now holds a position in the controller's department of the Ohio State Telephone Co., at Columbus, Ohio, in which city they will make their home.

Miss Singletary has been with the Consolidated Telephone & Telegraph Co. almost since its inception in 1914, and succeeded to the position of auditor in December, 1915.

J. Haster, of San Antonio, Texas, has been appointed local manager for the Southwestern Telegraph & Telephone Co. at Elgin, Texas.

R. M. Clark, local manager for the Iowa Telephone Co., at Carroll, Iowa, has resigned. As soon as his successor is appointed, he will leave for Montana where he expects to engage in the hardware business with his brother.

L. F. Steele, who has operated the Hustonville (Ky.) Telephone Co. for the past year, making numerous improvements, has sold it to J. P. Gann for $10,000. It is reported to be one of the best paying telephone properties in the Hustonville section.

Louis K. Webb, Louisville, Ky., district manager of the Cumberland Telephone & Telegraph Co., has been promoted to commercial superintendent of the Kentucky division.

Keith Conway, special agent to the general manager of the Cumberland Telephone & Telegraph Co., has been appointed district manager at Louisville, Ky.

George G. Hall, commercial superintendent of the Kentucky division of the Cumberland Telephone & Telegraph Co., has been appointed general manager of the Southern Telephone Co., of Indiana, with headquarters at Evansville, Ind.

J. R. A. Hobson, who went to Evansville, Ind., a year ago as general manager of the Southern Telephone Co. of Indiana, has resigned.

W. H. Fuller, who for the past seven years has been manager of the Elgin, Texas, exchange of the Southwestern Telegraph & Telephone Co., has been transferred to the San Marcos exchange.

Obituary.

Judson C. Clements, member of the interstate commerce commission, died at Washington, D. C., June 18. Commissioner Clements served on the commission since 1892 and once had been chairman. He was 60 years old, a native of Georgia, and before going on the commission had served five terms in congress, representing the district of which his home, Rome, Ga., was the center. He was a Democrat, first appointed by President Cleveland, but was reappointed by President Taft, and again by President Wilson.

From Factory and Salesroom

New Central Energy Equipment for Attica, Ind., Exchange.

One of the chief improvements to be made to the Attica Telephone Co.'s plant at Attica, Ind., will be the installation of a new 900-line central energy lamp signal multiple switchboard, for which a contract has been made with the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y.

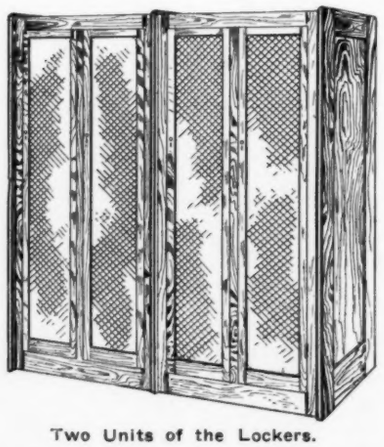
The central office apparatus now in service will be replaced by new equipment, including, in addition to the main switchboard, a two-position toll switchboard, main distributing frame, relay rack, cable racks and power plant. Included in the last-named item are a set of storage batteries, a four-frequency harmonic converter, and a relay interrupter set.

In accordance with the telephone company's progressive policies, the new main switchboard will include many of the Stromberg-Carlson company's automatic feature circuits and apparatus such as automatic periodic ringing with instantaneous disconnect, automatic listening, flashing recall signal on the answering cords. The use of these devices, together with the arrangement of the line lamps associated with the multiple jacks, will increase the speed and accuracy of the service rendered.

The increase in the amount of long-distance business originating in and clearing through Attica will be cared for adequately by the new toll switchboard, which is to be a model of its kind. The toll board will be fitted for the immediate operation of 20 long-distance lines with an ultimate capacity for 10 more. It will be fitted with both universal and toll-to-toll cord circuits designed to give maximum transmission efficiency under all operating conditions.

Lockers Which Harmonize with Telephone Booths.

The lockers illustrated on this page should be of interest to telephone people for many reasons. It is practically imperative that some place be provided for the clothing of employes. Instead of having "built-in" wardrobes, these "unit" lockers represent many savings. They may be purchased a section at a time, as needed, and more purchased when more help is employed.



Two Units of the Lockers.

If it is necessary to move to another building, or to use the space devoted to lockers to other purposes, this style of locker can be moved with no damage whatever. With a growing concern, built-in fixtures mean either too much equipment at the start, expensive alteration charges, or inadequate equipment after some expansion.

With the increasing demand for women employes, it is important that they be provided with proper places for their apparel—both for protection against damage and against loss. These lockers are provided with locks, and with wire mesh, glass, or wood-panel doors.

These particular booths are designed to harmonize with wooden telephone booths—especially the popular folding-door booths—so that the combination makes a pleasing outfit. The illustration shows two "unit," or four lockers. Each unit is composed of two separate lockers. Further information may be obtained from the Yesbera Mfg. Co., 2308 Albion St., Toledo, Ohio.

New Edition of "Wire in Electrical Construction."

The John A. Roebling's Sons Co., of Trenton, N. J., has just issued the third edition of "Wire in Electrical Construction." This little book is well known to all electrical men for the number and variety of tables and wire data, especially copper wire, useful in their work. The second edition was issued in 1906.

There undoubtedly will be a great demand for this edition, as the former editions have been exceedingly popular.

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TELEPHONE WIRE

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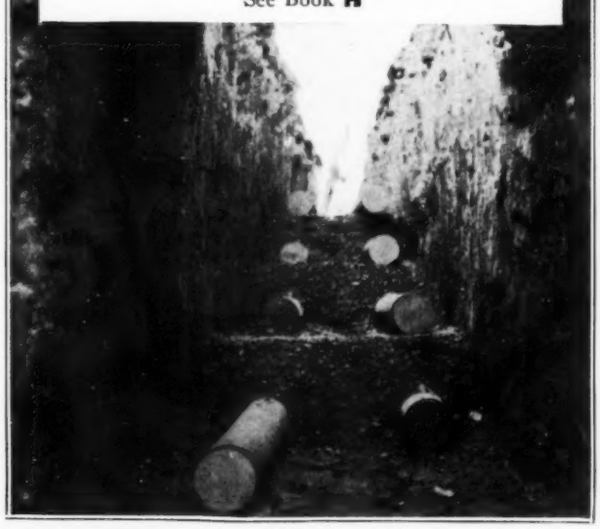
Not only efficient but economical. Light weight, cuts freight bills and speeds up the work. Low First Cost.

See Book H



THE FIBRE-CONDUIT COMPANY

ORANGEBURG, N. Y.

NEW YORK BOSTON CHICAGO SAN FRANCISCO

You can join up Johns-Manville Fibre Conduit air-tight and smooth

WHEN moisture gets into an underground cable duct you can expect trouble any minute. It's a tremendously difficult proposition to lay a moisture-proof cable conduit line with clay ducts. Because cracked sections are easily installed when the boss isn't looking—and moisture gets in.

Another thing, sharp edges are frequent at the joints and when cable is hauled in, the insulation is cut and the cause of a troublesome, if not disastrous, "ground" has been created.

Johns-Manville Fibre Conduit is permanently moisture-proof from end to end—joints and all. And the interior surface at the joints is just as smooth as in the middle of a section.

Approved by the National Board of Fire Underwriters.

JOHNS-MANVILLE SERVICE

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Serves More People in More Ways Than Any Other Institution of Its Kind in the World

H. W. JOHNS-MANVILLE CO.

NEW YORK CITY

10 Factories - Branches in 55 Large Cities

New Set of Kellogg Advertising Slides.

In response to the demand for new advertising slides and printing plates that will show in a graphic way the great need for higher rates because of the vast increase in the cost of everything that the exchange manager has to buy, the Kellogg Switchboard & Supply Co. has issued, and is now distributing, a set of eight new slides, some of which are reproduced in the accompanying illustrations.

They are, indeed, "Telephone Facts" with a vengeance.

Two of them show graphically the need of constant upkeep and repairs in any telephone system necessary to give satisfactory service.

"TELEPHONE FACTS"
AN UP TO DATE EXCHANGE THAT CAN GIVE YOU THE SERVICE YOU WANT. IT MUST HAVE GOOD EQUIPMENT
WHAT LOW RATES DO FOR A TELEPHONE COMPANY! NEGLEGTED LINE CONSTRUCTION. DISREPUTABLE SERVICE IS SURE WITH SNARLED, WORN OUT WIRES THAT YOU SEE HERE
Blank Space for Name

"Telephone Facts" to Help Secure Better Rates.

Three of the slides show by means of comparative illustrations and clear, short, terse sentences, the means of giving present day service with the material to be obtained. Two of them are additions to the Kellogg company's extensive line of advertising service plates, illustrating in a graphic manner the way of correct telephone usage.

"TELEPHONE FACTS"
Dry Batteries are "Telephone Fuel"
ONE BARREL OF 125 NO. 6 DRY BATTERIES
FORMER COST $13.00
ONE KEG OF 50 NO. 6 DRY BATTERIES AVERAGE COST PAST YEAR $13.00
THE KEG OF BATTERIES SHOWN ABOVE GIVE ONLY ONE THIRD AS MUCH TELEPHONE SERVICE AS THE BARREL OF BATTERIES AT THE SAME COST, WHEN PRESENT TELEPHONE RATES WERE MADE.
Blank Space for Name

High Cost of Telephone Fuel.

Speaking with lips at mouthpiece brings you up to the distant party at the rate of 120 miles per inch of reduced air gap.
Blank Space for Name

Another "How to Talk" Idea.

These plates are being sent out under the same arrangement as all of Kellogg advertising service.

In this connection the fact may be mentioned that the Kellogg company was the first to provide the operating man with helpful service advertising. About 1902, or earlier, the first Kellogg "Way to Talk" plates were distributed, and these showed in graphic comparison, both with photographs and line drawings, the correct and the incorrect way to handle a telephone. The original idea has been remade from time to time to keep pace with improved apparatus.

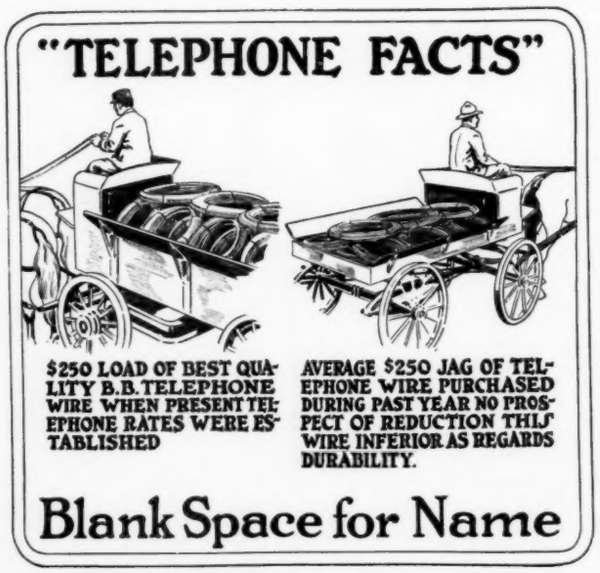
In those days there were, figuratively speaking, but a handful of telephones in service throughout the country and, naturally, people did not know how to use them. Today, however, with a telephone in every store and office, there are still people who either do not know how to telephone properly or do so in a careless way. Furthermore, there is the yearly crop of youngsters who "'phone to daddy" for the first time. They must be taught by illustrations as soon as they can read pictures, and that is considerably earlier than when they can read printed notices.

Even before the "Way to Talk" plates, the Kellogg company's publicity was an educational service, not only for the man at the head of the exchange, but for his subscribers.

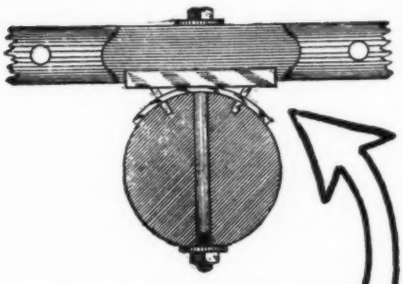
Today the Kellogg Switchboard & Supply Co. is said to be foremost in the field in the matter of helpful advertising service for the Independent telephone man. At great expense it has collected, and is continually increasing, its altogether original line of advertising plates, covering all the past needs of the Independent manager and new ones as they arise.

The Kellogg company has borne the expense of this original work, never charging except for the actual cost of electrotypes, more as a matter of record than anything else.

Even though the telephone manager may not care for new subscribers at this time he should start, or continue, an advertising campaign, to teach his patrons the proper usage of the telephone, to make them appreciate the difference between good service and bad, to acquaint them


"TELEPHONE FACTS"
$250 LOAD OF BEST QUALITY B.B. TELEPHONE WIRE WHEN PRESENT TELEPHONE RATES WERE ESTABLISHED
AVERAGE $250 JAG OF TELEPHONE WIRE PURCHASED DURING PAST YEAR NO PROSPECT OF REDUCTION THIS WIRE INFERIOR AS REGARDS DURABILITY.
Blank Space for Name

A Wire Cost Comparison.



What's the use of slashing your poles-why buy braces-when for less expense the

HALLETT STEEL GAIN

will do the work more satisfactorily and for less cost? No cross arm brace is necessary; no needless weakening of the poles.

New cross arms can now be used on old poles having rotted gains with safety. Facilitate placing cross arms squarely and resist lateral or side strains. The logical and inexpensive way to mount cross arms.

Order direct, or of your jobber.

Write for descriptive literature.

THE HALLETT IRON WORKS

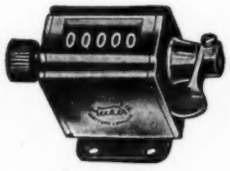
HARVEY :: :: :: ILLINOIS

Veeder Small Set Back Counters

for

Telephone Switchboards

One Turn of the Knob Resets to Zero



Indispensable for Making Traffic Records

One-half Size

As it is desirable that telephone exchanges learn periodically the comparative amount of work performed daily by the operators as well as the total number of calls answered daily, this counter is almost indispensable to an up-to-date exchange.

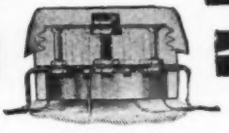
Write for Catalog which Gives a Complete Description

The Veeder Mfg. Co.

11 Sargeant St., Hartford, Conn.

Cyclometers for Bicycles and Motorcycles, Odometers for Automobiles and Horse Drawn Vehicles, Counters for Practically Every Possible Purpose, Tachometers, Tachodometers, and Fine Die Castings.

COX



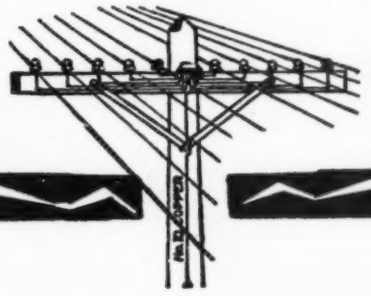
Multiple Lightning Arrester

THE COMMON SENSE ARRESTER—Installed on the poles and distributed along the lines where the lightning strikes.

Do you realize what a relief it is after a lightning storm to find that your lines show **NO FUSES BLOWN, NO CARBON GROUNDS?** Your **SERVICE** has been **PROTECTED** as well as your **EQUIPMENT** and there is no demand for rebate.

One Dozen ($15.00) will protect 100 telephones.

COX LIGHTNING ARRESTER CO., Eaton, Ohio



with his problems and prepare the way for the rate increase which the company may need. There is no better medium for such publicity than the local picture show, and these new slides will help.

The Kellogg line of illustrations and its advertising bulletins are invariably original. The company is a leader in the production of contract making, advertising and publicity plates, and complete campaigns for the Independent telephone exchange. It is also energetic in pushing the operating value of Kellogg apparatus itself.

Electric Spotlights for Use in Telephone Repair Work.

The automobile spotlight has proved itself a wonderfully useful necessity to the pleasure car owner by providing a source of light that can be instantly guided in any direction. The illustration shows an interesting use of the spotlight as it is being utilized by street railway companies and public service corporations to assist in repair work at night.

The spotlight in the picture and the one that is in wide use for this purpose is the Howe. Its peculiar advantage for this work is due to its ingenious patented bracket. This bracket is a universal joint bracket, both joints turning at the same time, so that the lamp can be turned instantly to any angle.

Though free and easily directed, and moved with very little effort, the lamp stays where it is directed until again moved, because of spring control. Two coil springs hold the two joints in a firm, even pressure. Jars and vibration do not affect the position of the lamp and all wear is compensated.

The Howe spotlight is made entirely from stampings and its weight is less than two pounds. The reflector is a true parabolic one, and is said to give a perfect spotlight at any distance, and always in focus. This spotlight fits to any windshield through the use of special clamps provided to fit the different styles of windshield frames. By loosening one set screw, it is easily removed for use as trouble lamp.

The wire is concealed in and protected by the bracket and the "on and off" switch of the knob can be operated by a heavily-gloved hand, and with the same motion with which the lamp is directed.

Troubleman Working at Night.

The line of Howe spotlights includes models with rear-view mirror, and a single shell lamp of lighter construction.

Drop the editor of TELEPHONY a line if you are interested in receiving a very interesting folder descriptive of Howe searchlights.

Automatic Ordered for Another Saskatchewan Exchange.

The Saskatchewan Government Telephone Department has decided to equip its Swift Current exchange with automatic telephones and has placed an order with the Automatic Electric Co. for an initial installation of 925 lines.

The Saskatchewan government was the first in Western Canada to install the automatic system, the earliest exchange being at Saskatoon. Since then the Alberta and Manitoba governments have taken a similar course, and now a total of ten cities are thus equipped, or orders have been placed for their equipping.

These include Strathcona, Edmonton, Lethbridge, two in Calgary, Medicine Hat, Regina, Prince Albert, and Brandon, which was ordered by the Manitoba government in April of this year.

Book Review.

EXAMPLES IN BATTERY ENGINEERING, by Prof. F. E. Austin, Hanover, N. H. Published by the author; 90 pages, 7½ by 4½ inches; price $1.25.

In this book some 22 problems on both the primary and secondary or storage batteries are presented. About two-thirds of the book is devoted to a discussion relative to primary batteries. The first few pages consider the units involved in batteries and the important physical and chemical laws. Electromotive force and resistance of primary cells are discussed, after which the effect of temperature on internal resistance is considered together with the current obtained from cells.

Methods of connecting cells together are shown and illustrations given of the current obtained from the various arrangements. The power from a battery and the operation of a series motor by a battery is considered in some detail.

Descriptions are given of storage batteries and their action. Charging under different conditions is explained.

The book is of convenient size for carrying in the pocket and much valuable information is imparted by the diagrams, examples and problems.

Record of Telephone Patents

1,226,886. May 22, 1917; filed May 13, 1913. TELEPHONE TRANSMITTER; 15 claims; N. H. Holland, West Orange, N. J.; assigned to New Jersey Patent Co., West Orange, N. J. The feature of this transmitter is a pneumatic dash pot which coacts with the second electrode which is movable relatively to another electrode which is arranged to vibrate in accordance with pulsations transmitted to it. The dash pot prevents the vibration of the second electrode by the vibration of the first.

1,226,966. May 22, 1917; filed February 3, 1910. TELEPHONE SYSTEM AND APPARATUS; 14 claims; C. L. Goodrum, New York; assigned to Western Electric Co. An automatic switch for telephone exchanges in which the contacts are arranged in circular relation. A concentrically-mounted arm sweeps over the contacts, making long steps in one direction and relatively shorter steps in the opposite direction.

1,226,981. May 22, 1917; filed January 4, 1915. TELEPHONE CALL REGISTERING SYSTEM; 11 claims A. E. Lundell, New York City, and H. G. Eddy, Bayonne, N. J.; assigned to Western Electric Co. A sequence switch is adapted to control the connection and disconnection of an operator's telephone with calling line. This switch has a listening-in, a first listening-out, call registering and second listening-out position.

1,227,010. May 22, 1917; filed June 8, 1915. TELEPHONE EXCHANGE SYSTEM; seven claims; E. H. Smythe, Chicago; assigned to Western Electric Co. A ring-back arrangement for a common battery cord circuit is described. The ringing current is normally applied to the calling end of the cord circuit but an electromagnetic ringing key is adapted when operated to apply it to the answering end. This ringing key is controlled jointly by a manually-operated switch and the answering and calling supervisory relays.

1,227,030. May 22, 1917; filed October 7, 1913. HAND AUDIPHONE; four claims; F. A. Barber, Boston, Mass.; assigned to Globe Earphone Co., Boston. A portable telephone in which a removable battery is carried in a hollow cylindrical handle is covered by this battery.

1,227,111. May 22, 1917; filed June 4, 1915. INSULATOR BLOCK CABLE BRACKET HANGER; one claim; E. J. Burdick, Detroit, Mich. This cable support comprises an arm with several V-shaped seat portions in which an insulator may be placed and the cable hung thereon.

1,227,113. May 22, 1917; filed July 15, 1915. ELECTRIC WAVE FILTER; six claims; G. A. Campbell, Montclair, N. J.; assigned to American Telephone & Telegraph Co. This wave filter consists of a telephone line composed of a number of sections. Each section contains lump impedance in series with the line and lump impedance in shunt across it. The impedance have precomputed values dependent upon the upper limiting frequency and the lower limiting frequency

Announcing a New Hand Book

on Underground Electrical Installations with

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A complete treatise on cable and glazed Conduit Construction

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NATIONAL FIRE PROOFING COMPANY

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ON YOUR **TELEPHONES**

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Highest Efficiency
Greatest Recuperation
Long Life
Fully Guaranteed

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UNIVERSAL CARBON CO.
DUNDEE, ILLINOIS

DON'T LET LIGHTNING WIPE YOU OFF THE MAP

PROTECT YOUR EQUIPMENT PERMANENTLY WITH

ARGUS LIGHTNING ARRESTERS

"The Field's Standard of Protection"

FOOTE PIERSON & COMPANY, Inc.
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QUICKER THAN LIGHTNING"

Trouble Detectives!

PIGNOLET Portable Testing Meters will locate any kind of trouble besides measuring volts and amperes; will also determine resistance of coils, lines, ringers, etc.

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AMMETERS
VOLT-AMMETERS

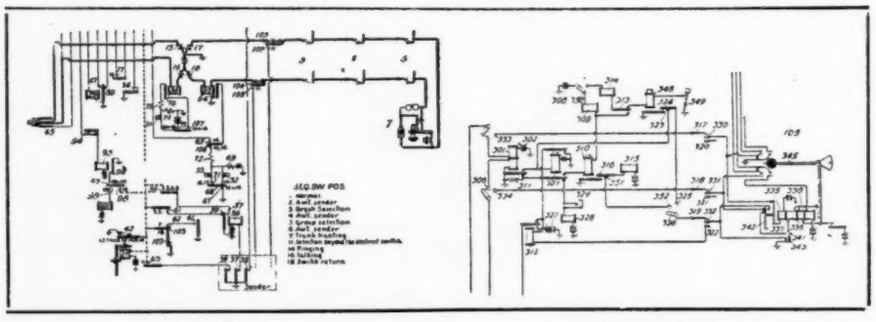
Suppose you let us send you a copy of the PIGNOLET Catalogue. It's worth while.

L. M. PIGNOLET
80 Cortlandt Street New York
Medal Panama-Pacific International Exposition

of a range of frequencies it is desired to transmit without attentuation. The values of the condensers and the coils are so proportioned that the structure transmits with practically negligible attenuation sinusoidal currents of all frequencies lying between the two limiting frequencies, while attenuating and approximately extinguishing currents of neighboring frequencies lying outside of the limiting frequency.

1,227,114. May 22, 1917; filed June 5, 1916. ELECTRICAL RECEIVING TRANSLATING OR REPEATING CIRCUIT; 10 claims; G. A. Campbell, Montclair, N. J.; assigned to American Telephone & Telegraph Co. This circuit is made up of a combination with a telephone line of a vacuum tube repeater, a wave filter for limiting the range of frequencies transmitted by the repeater, and an artificial line simulating the impedance characteristics of the telephone line only over the limited range of frequencies.

1,227,153. May 22, 1917; filed September 7, 1915; TELEPHONE EXCHANGE SYSTEM; seven claims; L. H. Johnson, Bloomfield, N. J.; assigned to Western Electric Co. A description is given of a cord circuit whereby the operator's set is normally excluded from the circuit when



No. 1,226,981.

No. 1,227,932.

the connected line circulars are closed at the subscriber's station. Provision is made so that the subscriber may render the excluding means ineffective to permit the operator's set being connected to the cord circuit.

1,227,167. May 22, 1917; filed June 16, 1911. ROPE CLAMP; six claims; C. L. Matthews, St. Louis; assigned to W. N. Matthews & Brother. This clamp comprises in combination a hollow member having seats for a number of strands and a wedge member adapted to be frictionally retained within the hollow member and having rocking engagement therewith.

1,227,168. May 22, 1917; filed July 30, 1915. EYE FOR GUY ATTACHMENTS; one claim; C. L. Matthews, St. Louis, Mo.; assigned to W. N. Matthews & Brother, St. Louis. This consists of an eye member which is formed with side parts adapted to center a ring member on the bearing member. The ring member passes through the aperture of the eye and is revoluble about the bearing member of the eye.

1,227,474. May 22, 1917; filed August 11, 1913. TELEPHONE SYSTEM; 129 claims; T. G. Martin, Chicago; assigned to Automatic Electric Co. Describes an automatic system in which provision is made for extending a connection from a manual line to an automatic connector switch by which connection is made to an automatic line. A discriminating busy test is provided for indicating whether an automatic line or a manual line is connected with the connector switch.

1,227,582. May 29, 1917; filed December 27, 1915. TELEPHONE EXCHANGE SYSTEM; six claims; H. P. Clausen, Mt Vernon, N. Y.; assigned to Western Electric Co. A busy-back circuit and its operation is the feature of this patent.

1,227,609. May 29, 1917; filed June 23, 1915. TELEPHONE EXCHANGE SYSTEM; five claims; C. L. Goodrum, New York; assigned to Western Electric Co. An automatic system in which a relay is located at the connector to control the sources of signaling current is described.

1,227,735. May 29, 1917; filed December 20, 1913. SYSTEM FOR CONNECTING TELEPHONS STATIONS; nine claims; L. D. Barrows, New York, and H. P. Charlesworth, East Orange, N. J.; assigned to American Telephone & Telegraph Co. In this party line lockout system relays are used for connecting and disconnecting the stations from the line.

1,227,895. May 29, 1917; filed September 14, 1915. TELEPHONE EXCHANGE SYSTEM; six claims; B. G. Dunham, Hawthorne, N. J.; assigned to Western Electric Co. In this automatic system a primary and secondary electromagnet control the selective operation of the selector switch.

1,227,904. May 29, 1917; filed March 23, 1916. CONTACT BANK FOR AUTOMATIC SWITCHING DEVICES; six claims; C. L. Goodrum and H. F. Dobbins, New York; assigned to Western Electric Co. In this switch bank sets of superposed flat strips are arranged in pairs. The strips of a pair have portions intermediate therein offset in the plane of the strips to effect a transposed relation between portions of the strip.

1,227,932. May 29, 1917; filed May 10, 1913. AUTOMATIC TELEPHONE EXCHANGE SYSTEM; 14 claims; F. N. Reeves, Newark, N. J., and A. E. Lundell, N. Y.; assigned to Western Electric Co. In an automatic exchange having a second office, provision is made at the main office whereby upon the initiation of all calls at the second office the subscriber's line will be connected to an inter-office trunk and connected to a local trunk only when the calling and called subscribers are in the second office.

1,227,936. May 29, 1917; filed December 30, 1915. TELEPHONE PLUG EJECTOR; five claims; H. B. Rodier, Washington. D. C.; assigned one-fourth each to I. N. Boernstein, P. Koester and R. B. Gotta, Washington, D. C. This ejector comprises a circuit which includes a solenoid for ejecting the plug when energized.

1,228,007. May 29, 1917; filed April 24, 1916. CONNECTOR REPEATER SWITCH OF AUTOMATIC TELEPHONE EXCHANGES FOR HANDLING FIRE ALARM CALLS; 10 claims; J. Erickson, Chicago; assigned to R. H. Rogers, Rochester, N. Y. Describes extra automatic equipment for association with automatic telephone exchange equipment for handling fire alarms.

1,228,167. May 29, 1917; filed January 29, 1916. AUXILIARY SUPERVISORY SIGNAL SYSTEM; five claims; H. M. Bascom, Brooklyn, N. Y.; assigned to American Telephone & Telegraph Co. A supervisory relay is associated with the cord circuit and has one contact in the circuit of a make-before-break relay. A signal is controlled by this latter circuit.

1,228,394. June 5, 1917; filed May 3, 1916; DISINFECTING AND ADVERTISING DEVICE FOR TELEPHONES AND LIKE; three claims; L. Block, Brooklyn, N. Y.; assigned to M. Frankl, New York City. This device is placed in front of the ordinary transmitter mouthpiece and attached to it by means of spring wires.

1,228,468. June 5, 1917; filed January 2, 1917. METHOD OF LOCATING SPECIAL TRANSPOSITION POINTS; two claims; H. Mouradian, Philadelphia, Pa.; assigned to American Telephone & Telegraph Co. This method of locating special transposition points consists in tentatively transposing the circuit and then determining the capacity to ground necessary to effect a balance of the inductive disturbances. The circuit is then again tentatively transposed and the capacity necessary to effect a balance under these conditions determined. Finally the transposition is made at a point fixed by the nature of the change in such capacities.

1,228,537. June 5, 1917; filed October 29, 1915. TELEPHONE SYSTEM; five claims; W. W. Dean, Rochester, N. Y.; assigned to Stromberg-Carlson Telephone Mfg. Co. The feature of this cord circuit is a supervisory signal device and a separate recall signaling device, individual to the cord circuit with a supervisory relay controlling both of the signals.

1,228,634. June 5, 1917; filed February 13, 1917. INTERCOMMUNICATING LOCKOUT TELEPHONE SYSTEM; six claims; F. W. Adsit, Minneapolis, Minn. At each subscriber's station an alternating current generator is installed and connected with contact points which make contact by the rotation of the generator shaft.

1,228,778. June 5, 1917; filed July 1, 1913. KNIFE SWITCH RELAY; three claims; W. Kaisling, Chicago; assigned to Kellogg Switchboard & Supply Co. Constructional details of a relay having a U-shaped heel iron are given.

1,229,165. June 5, 1917; filed August 7, 1905. TELEPHONE EXCHANGE SYSTEM; 121 claims; H. D. Stroud, Chicago; assigned to Kellogg Switchboard & Supply Co. A semi-automatic system is covered by this patent.

1,229,272. June 12, 1917, filed December 30, 1916. INSULATOR; six claims; J. J. Irwin, Cleveland, Ohio. In this insulator a transverse groove for the reception of the line wire is placed below the plane of a downwardly facing ledge which is adapted to be engaged by a tie wire. This distance is substantially equal to the combined thickness of the wire and the line wire.

1,229,347. June 12, 1917; filed April 14, 1916. TELEPHONE CALL REGISTERING DEVICE; 22 claims; V. Thompson, Vancouver, B. C., Can. Details are given of a telephone pay station in which a coin seat is placed at the lower end of the coin chute. A circuit is closed by a coin occupying this seat. An electromagnetic means dislodges the coin from the seat and each dislodgement is registered by mechanically-operated mechanism.

1,229,348. June 12, 1917; filed May 16, 1916. TELEPHONE CALL REGISTERING DEVICE; 13 claims; V. Thompson, Vancouver, British Columbia, Canada. The feature of this pay station device is a serrated traveling disk which carries two diametrically coin located coin-holding frames. Provision is made for imparting a step-by-

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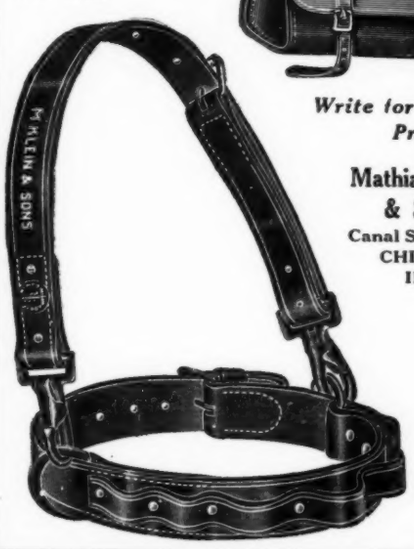
We Advise Purchases at Once to Avoid Disappointment in Price and Delivery

Scarcity and Advancing Prices Due To War



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Mathias Klein & Sons
Canal Station 28
CHICAGO
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Swisher Cable Hangers

Why does the construction foreman who has tried every kind of cable hangers always demand the SWISHER?

He knows that once Swisher Hangers are installed his cable lines are secure and his troubles are over.

They are made on the right principles and have proved the best in actual service in the telephone field.

Write for catalog and price list.

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For Your Test Sets From Your Jobber or
Sample, postpaid, 15c
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Construction Material and Supplies
Square deal, try us
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25 Years' Experience. High Class Reference

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Yellow Pine Cross Arms, Pins and Brackets. Write us.
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Please tell the Advertiser you saw his Advertisement in TELEPHONY.

step movement to the disk when one coin seat is occupied so as to carry the other seat into alignment with the mouth of the chute and also to actuate registering means.

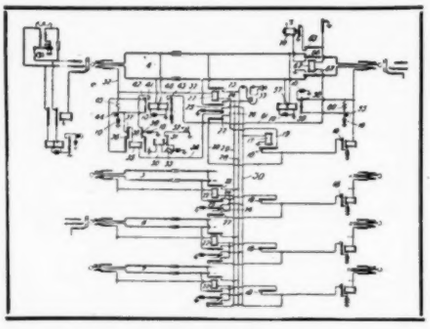
1,229,596. June 12, 1917; filed June 4, 1907. NON-GROUNDED REPEATER SYSTEM; 31 claims; E. D. Fales, La Grange, Ill.; assigned to Automatic Electric Co. Details are given covering the operation of a pair of line relays for the repeater.

1,229,634. June 12, 1917; filed August 17, 1914. TELEPHONE TRANSMITTEC; R. H. Manson, Rochester, N. Y.; assigned to Stromberg-Carlson Telephone Mfg. Co. Details are given relative to keeping the transmitter parts in proper adjustment.

1,229,796. June 12, 1917; filed May 22, 1914. TELEGRAPH AND TELEPHONE SYSTEM; four claims; J. Schiessler, Baden, near Vienna, Austria. The line is included between two condensers, each of which has a grounded generator connected to it. An oscillating circuit includes an adjustible capacity between each generator and its pertaining condenser.

1,229,995. June 2, 1917; filed March 20, 1916. CABLE POTHEAD; two claims; G. F. Mainer, San Francisco, Cal. In this pothad, a collar is provided which has a bore to receive the cable and a solder-receiving groove in its inner end and extending into the bore so that the solder in the groove engages the cable.

1,230,117. June 19, 1917; filed November 6, 1915. TELEPHONE EXCHANGE SYSTEM; 13 claims; H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. A cord circuit is described which is provided with a listening relay that operates when the circuit is connected with a line, to connect the operator's telephone set. A common relay is actuated upon the operation of one listening relay to disable all the other listening relays.



No. 1,230,117.

1,230,170. June 19, 1917; filed April 5, 1913. TELEPHONY; 26 claims; M. L. Johnson, Chicago; assigned to Frank B. Cook Co., Chicago. A semi-automatic system is covered.

1,230,421. June 19, 1917; filed June 28, 1915. AUTOMATIC TELEPHONE EXCHANGE SYSTEM; three claims; A. E. Lundell, New York; assigned to Western Electric Co. Details of an automatic system are given in which a line relay is associated with a selector switch. It controls electromagnetic means for operating the selector switch.

1,230,553. June 19, 1917; filed June 30, 1915. TELEPHONE BOOTH AND THE METHOD OF MANUFACTURING IT; two claims; A. Beran, Hirschwang, Austria. This booth is made of corrugated paper which is composed of successive layers.

1,230,564. June 19, 1917; filed December 12, 1914. TELEPHONE EXCHANGE SYSTEM; 14 claims: H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. A busy signal is the feature of this common battery signal.

1,230,565. June 19, 1917; April 1, 915. TELEPHONE EXCHANGE SYSTEM; nine claims; H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. The feature of this cord circuit is provision whereby the calling current may be applied to either end of the cord circuit.

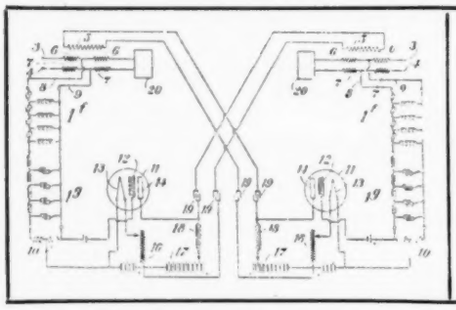
1,230,566. June 19, 1917; filed October 29, 1915. TELEPHONE EXCHANGE SYSTEM; nine claims; H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. In this cord circuit, a relay, when energized simultaneously, connects the source of ringing current to both telephone lines while an energizing circuit for the relay is completed upon the opening of the two lines.

1,230,578. June 19, 1917; filed July 19, 1915. TELEPHONE SIGNALING SYSTEM; five claims; E. E. Hinrichsen, New York; assigned to Western Electric Co. The automatic application and disconnection of the source of ringing current to the called line is covered.

1,230,582. June 19, 1917; filed March 11, 1915. TELEPHONE EXCHANGE SYSTEM; 12 claims; L. H. Johnson, Bloomfield, N. J.; assigned to Western Electric Co. Details are given for the connection of interrupter mechanism in circuit with the signaling device associated with the cord circuit.

1,230,639. June 19, 1917; filed October 7, 1913. SEMI-AUTOMATIC TELEPHONE SYSTEM; 18 claims; B. D. Willis, Oak Park, Ill.; assigned to Automatic Electric Co. In this system automatic switches are provided for extending connection from the B operator's board to a called line. Automatic means controlled by the B operator intermittently operate a visual signal on the A operator's board when the automatic switches attempt to make connection with a busy line.

1,230,694. June 19, 1917; filed April 16, 1910. TWO TO THREE-WIRE TELEPHONE SYSTEM; six claims; E. D. Fales, La Grange, Ill.; assigned to Automatic Electric Co. In this system a repeater controls the first selector by grounding one side of the line and then the other. The repeater is controlled by a circuit which includes the talking conductors in series.



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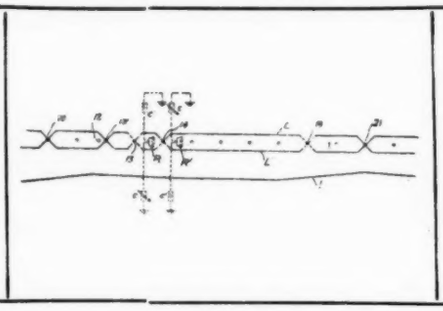

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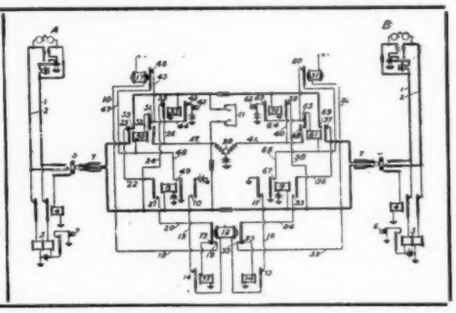

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